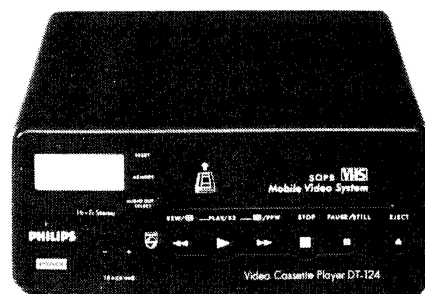


Service
Service
Service



Service Manual

12 V



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PHILIPS

1. SPECIFICATION.

GENERAL

Power supply	: 14.4V DC
Consumption	: Max. 15W
Fuses	: 1A(T), 5A(T)
Position of use	: Horizontally/ face up/left side up
Operating temperature	: 0-40°C
Operating humidity	: 10-80%
Dimensions (wxhxd)	: 215x95x269.5mm
Weight	: Approx. 3kg

VIDEO

TV system	: CCIR standard PAL colour
Output level	: 1.0Vp-p, 75Ω
Playback system	: VHS standard, helical scanning syst
Number of heads	: 4 rotary heads
Tape speed	: 23.39mm/s (SP) approx. 117mm/s (scan)
Wind/rewind time	: Approx. 4.5 min. (E180)

AUDIO

Output level	: -8dBV 1kΩ x2
Frequency response	: 20Hz-20kHz (Hi-Fi stereo)
Dynamic range	: > 85dB (Hi-Fi stereo)

ACCESSORIES

Direction for use	: 4822 736 21441
Remote control	: 4822 218 10442

WARNING

ESD

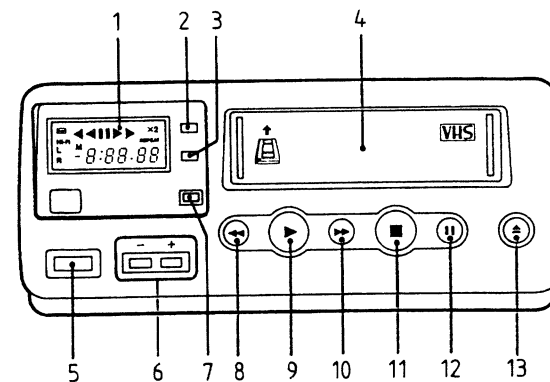


All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

2. CONTROLS AND CONNECTIONS

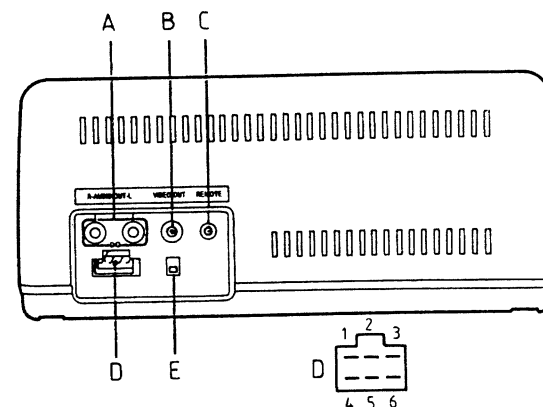
2.1 CONTROLS

- 1 Display
- 2 Reset
- 3 Memory
- 4 Cassette compartment
- 5 On/off
- 6 Tracking +/-
- 7 Audio out normal/Hi-Fi
- 8 Fast rewind/scan <
- 9 Play
- 10 Fast wind/scan >
- 11 Stop
- 12 Pause/still
- 13 Eject



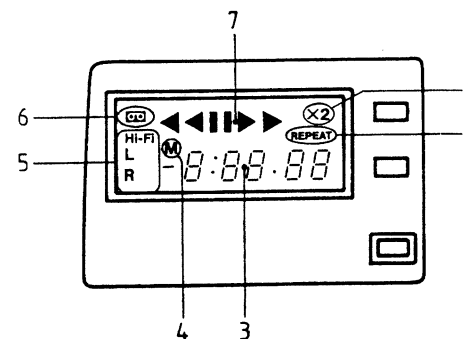
2.2 CONNECTIONS

- A Audio out L/R
- B Video out
- C Remote control
- D Power supply
- E Auto repeat playback on/off
- D1 Not connected
- D2 Ground
- D3 +14.4V DC permanent
- D4 Not connected
- D5 5V pulse (out)
- D6 + 14.4V DC switched



2.3 DISPLAY

- 1 Double speed indicator
- 2 Auto repeat playback indicator
- 3 Linear tape counter (hours, minutes, seconds)
- Moisture indicator: "d"
- 4 Memory indicator
- 5 Audio output indicator
 - Hi-Fi } Hi-Fi stereo, left and right channels
 - L }
 - R }
 - Hi-Fi } Left channel of Hi-Fi stereo
 - L }
 - Hi-Fi } Right channel of Hi-Fi stereo
 - R }
- 6 Cassette-in indicator
- 7 Operation mode indicator
 - ▶ : Normal playback
 - ▶▶ : Wind/Scan forward
 - ◀◀ : Rewind/Scan reverse
 - : Still
 - (flashing): Ejection
 - ▶▶ : Slow motion playback

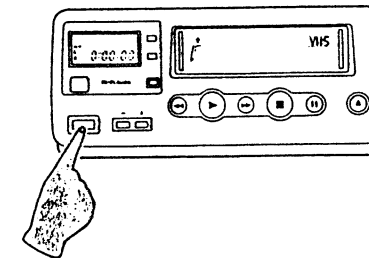


3. INSTRUCTIONS FOR USE

SWITCHING THE SET ON AND OFF.

Switching on.

Press the POWER button to switch on the set.



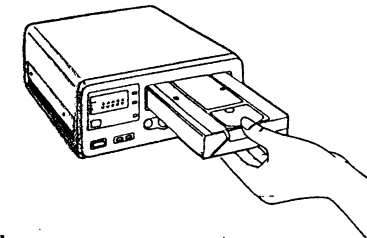
Switching off.

Press the POWER button again to switch off the set.

INSERTION/REMOVAL OF A CASSETTE.

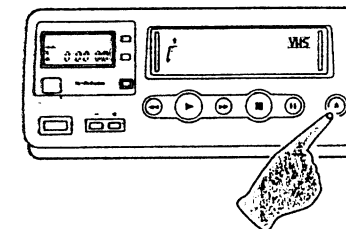
Insertion.

Insert a VHS cassette as shown. Hold it with the back to the right and the window upwards.



Removal.

Press the button. Indicator flashes in the display. The cassette is ejected. Pull it straight out.



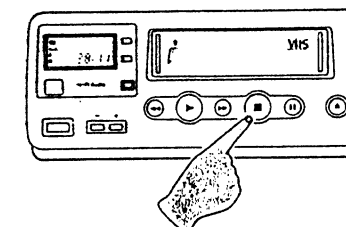
NOTES:

- When a video cassette is inserted with the power off (ignition key of the car in "ACC" or "ON" position), the set is automatically switched on, the counter is reset to "0:00.00", indicator appears in the display and playback starts (AUTO POWER ON).
- A cassette can be ejected even when the set is switched off (POWER OFF EJECT). It will not function if the ignition key of the car is in "OFF" position.
- If a cassette is not ejected when the button is pressed, switch the set off and on again, then press the button again.

STOP, FAST WIND AND FAST REWIND.

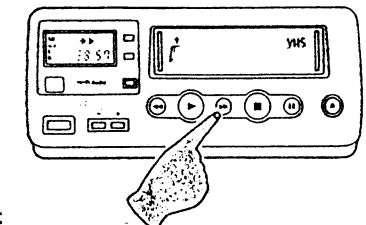
To stop the tape.

Press the button. All operation is stopped.



To wind the tape.

Press the button, then press the button. The tape is wound fast.

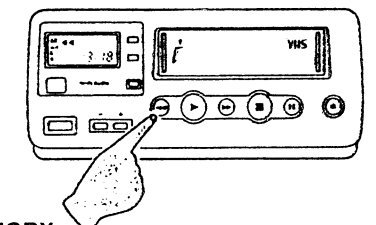


NOTE:

- The tape will be fully rewound automatically when it reaches the end (AUTO REWIND).

To rewind the tape.

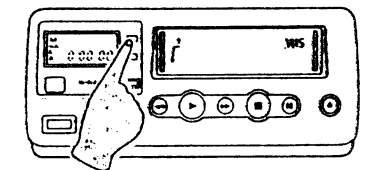
Press the button, then press the button. The tape is rewound fast.



TAPE MEMORY.

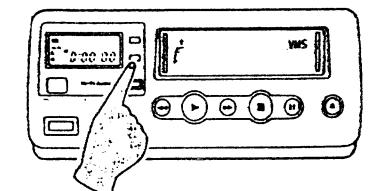
Reset the counter.

Press button 2 at the desired tape position. Counter is reset to "0:00.00".



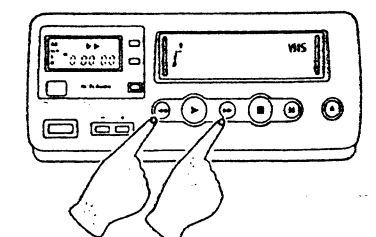
Activate the memory.

Press button 3. Indication "M" appears in the display.



Wind or rewind.

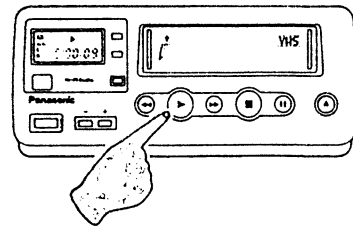
Press the or button. The operation stops automatically at counter position "0:00.00"



DOUBLE SPEED PLAYBACK, STILL.

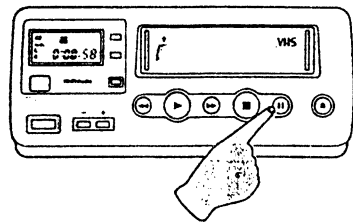
Double speed playback.

Press the ► button during playback. The picture is shown at approx. twice the normal speed.
Press the ► button again to resume normal playback.



Still.

Press the ■■ button during playback. A still picture is shown.
Press the ■■ button again to resume normal playback.

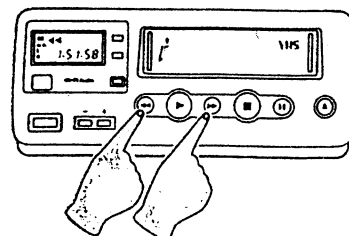


NOTES:

- Audio is muted during double speed playback.
- During double speed playback the picture may contain noise or vibration. THIS IS NOT A MALFUNCTION.
- If "still" continues for more than approx. 5 min., the set automatically switches over into "stop" mode.
- During "still" the upper part of the picture may be distorted. THIS IS NOT A MALFUNCTION.
- If the still picture shows bands of noise, switch to slow motion playback and adjust the tracking (see below).

SCAN.

Press the ►► button during playback. The tape is played in forward direction at a fast speed.
Press the ◄◄ button during playback. The tape is played in reverse direction at a fast speed.
Press the ►► or ◄◄ button again to resume normal playback.



NOTES:

- Audio is muted.
- The picture may be distorted or unstable. THIS IS NOT A MALFUNCTION.
- The tape is fully rewound automatically when it reaches the end during scan forward.
- The tape stops automatically when it reaches the beginning during scan reverse.

SLOW MOTION PLAYBACK.

(Only with remote control)

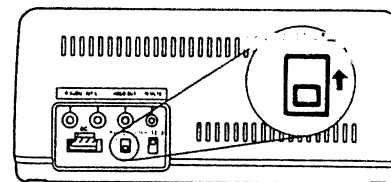
Press the SLOW button on the remote control during playback.
The tape is played at a lower speed.
Press the SLOW button again to resume normal playback.

NOTES:

- Audio is muted.
- If slow motion playback continues for more than approx. 5 min., the set automatically switches over into "stop" mode.
- If the picture shows bands of noise, adjust the tracking (see below).

AUTO REPEAT PLAYBACK.

Set switch E into ON position. Indication REPEAT appears in the display.
If an interruption of the video signal of approx. 1 s. is detected, the tape is automatically rewound to the beginning and playback is repeated.
Set switch E into OFF position to stop auto repeat playback.



NOTES:

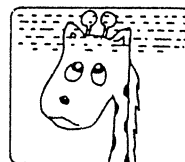
- Tape memory does not function during auto repeat playback.
- If repeat playback is continued many times, the quality of the picture will deteriorate.
- Auto repeat playback cannot be performed within 12 s. after playback starts.

TRACKING ADJUSTMENT.

Appearance.

Usually tracking adjustment is not necessary, because the set is equipped with a digital automatic tracking system.

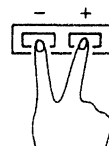
If bands of noise appear in the picture as shown tracking adjustment is necessary.



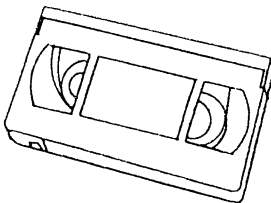
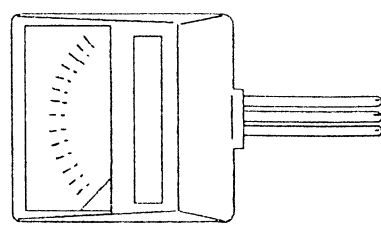
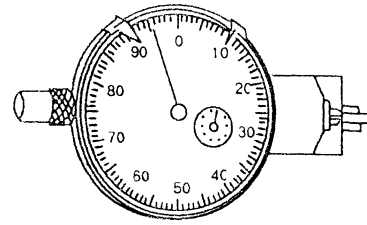
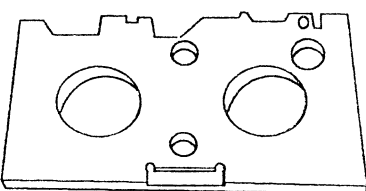
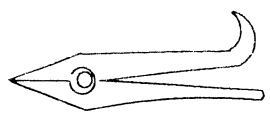
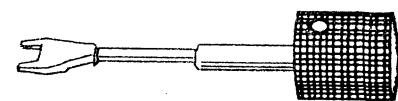
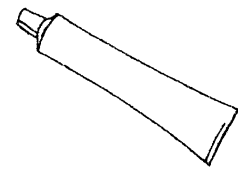
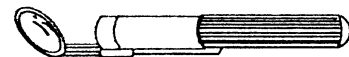
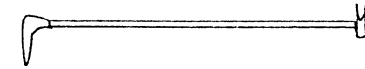
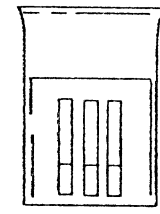
Adjustment.

Press the buttons 6 simultaneously to minimize the noise.

If the noise level fails to reach the optimum point, press the "+" or "-" button



4.1. SERVICE FIXTURES & TOOLS

4822 397 30103 PAL VHS ALIGNMENT TAPE 	4822 395 90584 BACK TENSION METER 	4822 395 80394 REEL TABLE HEIGHT FIXTURE 
4822 395 80395 POST ADJUSTMENT PLATE 	4822 395 40055 RETAINING RING REMOVER (3mm/4mm) 	4822 395 50428 H-POSITION ADJ. FIXTURE 
4822 395 50431 FINE ADJUSTMENT SCREWDRIVER 	4822 395 50275 POST ADJUSTMENT SCREWDRIVER 	4822 390 20027 MOLYKOTE DX GREASE 
4822 395 90585 CHECK LIGHT 	4822 395 50429 LOCK SCREW WRENCH 	4822 395 90256 HEAD CLEANING STICK 

4.2. SERVICE NOTES AND CAUTIONS

When servicing, take notice of following items.

A. Service Position

1. In the order described in the Disassembly Section, remove the Top Cover and open the Main C.B.A., page 1-2-1. Then carefully place it into the Service Position as shown in Fig. 1-1.

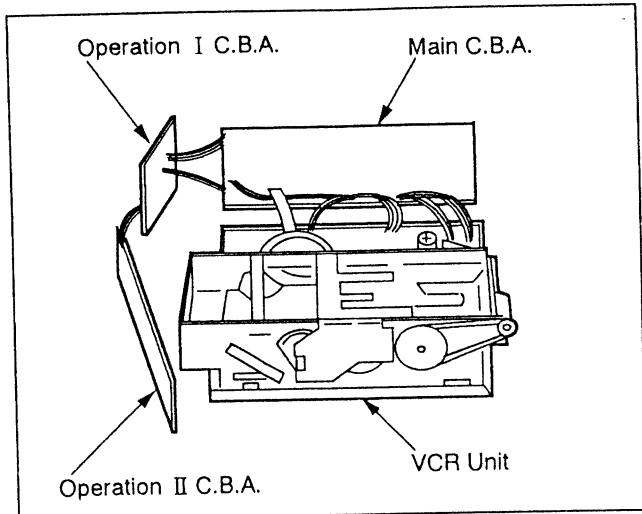


Fig. 1-1

2. When servicing the bottom portion of the Mechanical Chassis, remove the Mechanical Chassis from Bottom Case removing 3 Screw Covers, 2 Screws(S-13), 2 Screws (S-14) and Screw (S-15) in Fig. D7, page 1-2-3.
3. Next, place the Mechanical Chassis up side down as shown in Fig. 1-2.

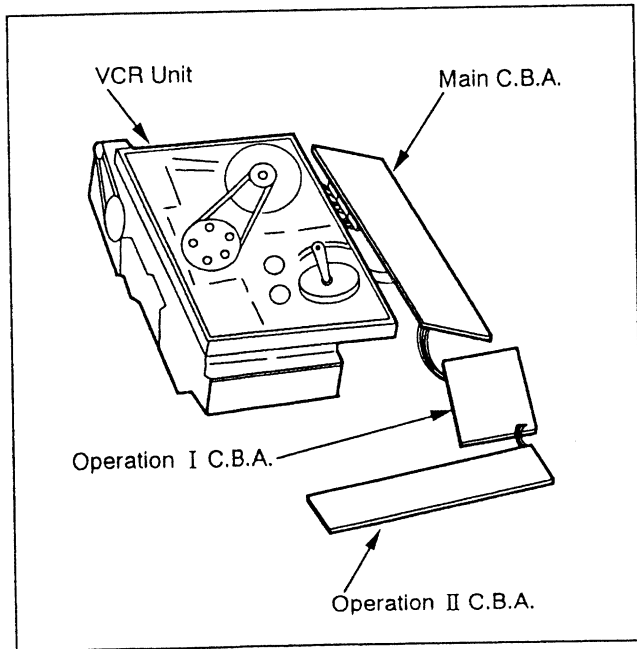


Fig. 1-2

B. Test Point Information

B-1. Actual Board on VCR

With this model, all Test Points use the foil solder pad for connection of the measuring equipment.

B-2. Schematic and C.B.A. Diagrams in this Service Manual

⊙ : Used for the indication of Test Point with No Test Pin.

B-3. Location of Test Points on page 22

○ : Used for the indication of Test Point with No Test Pin (Foil Solder Pad).

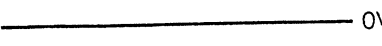
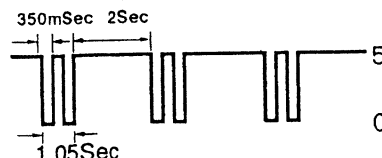
C. Simplified Fault Finding Point (TP6002)

This model has the Simplified Self-Diagnostic System to facilitate finding the cause when the Unit shuts off or stops automatically.

1. Preparation
Connect the OSCILLOSCOPE probe to TP6002 on the System Control Section of the Main C.B.A.

2. Indication
The Signal at TP6002 indicates the following causes.

Note:
In normal condition, DC +5V Signal at TP6002 is displayed.

No.	Information	Indication	Cause and characteristic
1.	Takeup Reel Lock	Low Voltage 	There is no TAKEUP REEL Sensor Pulse for 5 seconds or 1 second (only SEARCH MODE). (Takeup Reel Sensor Pulse at pin 68 of IC6001)
2.	Cylinder Lock	0.3Hz Pulse (Duty 50%) 	Cylinder Motor stops in the REC, PB,CUE, REVIEW, SLOW or STILL mode for 1 second. (Cylinder Lock (L) signal is detected inside IC6001)
3.	Exceeds Loading/Unloading Time	0.7Hz Pulse (Duty 50%) 	Loading/unloading time exceeds the normal loading/unloading time, with no shift to the next mode. (Position signals supplied from Mode Select Switch to pins 11-13 of IC6001)
4.	Exceeds Cassette Loading/Unloading Time	Intermittent Pulse 	Cassette loading/unloading time exceeds the normal cassette loading/unloading time, with no shift to the next mode. (Cassette Off (H) / Up (M) / Down(L) signal at pin 71 of IC6001)

D. Connection of the Flexible Cable to Trap Connector

Plug No.	Location of Trap Connector
D.D. Cylinder Unit - P3501	Main C.B.A.

For the Location of Pin 1 on the Trap Connectors, use the pin 1 indication on the Typical C.B.A.

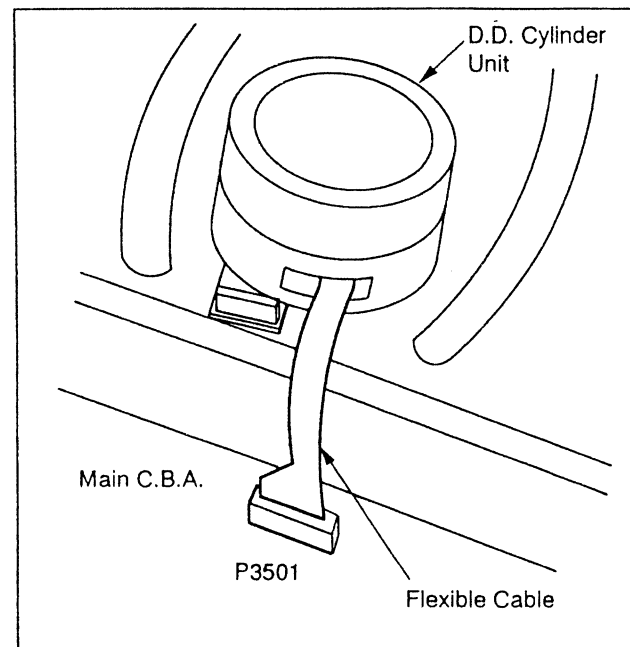


Fig. 3-1

(Removal or Installation of Flexible Cable)

a. Removal

- 1) On the Trap Connector, pull out both ends of the Locking Tab surrounding the cable end to release the Trap portion of the Connector. Then pull Flexible Cable out to remove as shown in Fig. 3-2.

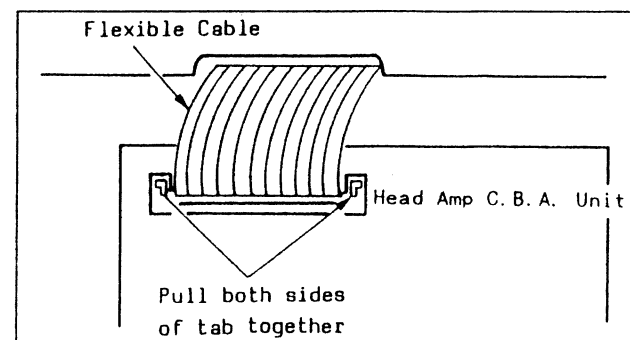


Fig. 3-2

b. Installation

1. Insert the end of the Flexible Cable into the Trap Connector so it lays smoothly across the slot.
2. Press the middle of the Cable firmly against the Trap Connector slot, and hold it securely.
3. Without pinching the Cable, press the Locking Tabs in against the Trap Connector until both ends snap into their locked position.
4. Pull lightly on the Cable to check for positive connection.

Note:

Take care when removing or installing the Flexible Cable to prevent Cable damage.

E. Cassette Tape for servicing with Left Side Down

This position is used only when servicing the Bottom portion of the Mechanical Chassis. If misloading of the cassette tape is encountered in this position, press the Cassette Tape firmly into the Cassette Up Unit with the left thumb.

F. Power supply

Because a Hot Chassis Ground is present in the Power Supply Circuit, a separated adjustable power supply unit must be used.

G. Service Test Point (TP6001)

The detection of the Supply / Takeup Photo Transistors, Reel Sensor and Cylinder Lock will be inhibited when TP6001 is grounded on the System Control Section of the Main C.B.A.

H. Method for Manual Loading / Unloading of VCR

Turn the Center Pulley Unit in Fig. 4 clockwise (for loading) or counterclockwise (for unloading) while pushing the change lever (located on bottom side) in Fig. 5 or pushing the plunger of the solenoid (located on top side) in Fig. 6 as indicated by the arrow mark to release the lock.

Bottom View

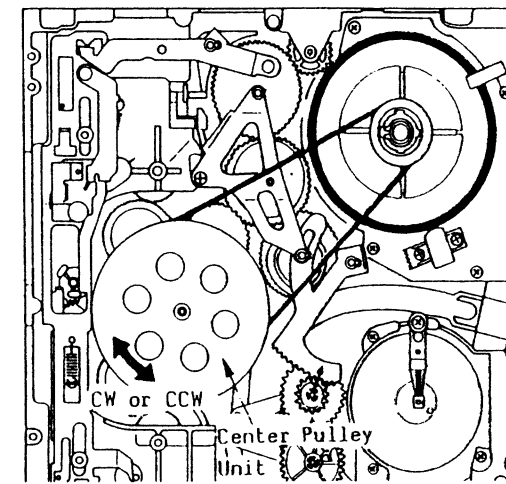


Fig. 4

Bottom View

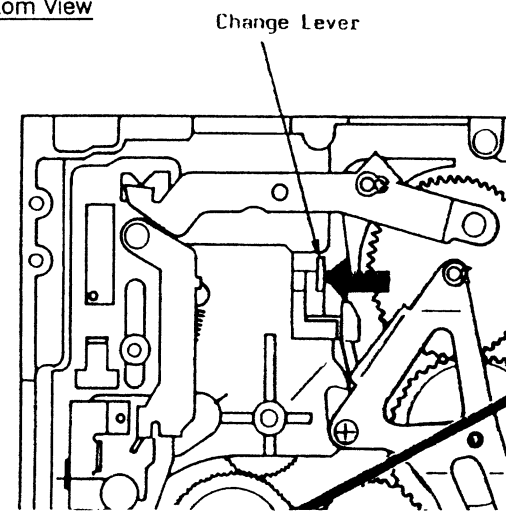


Fig. 5

Top View

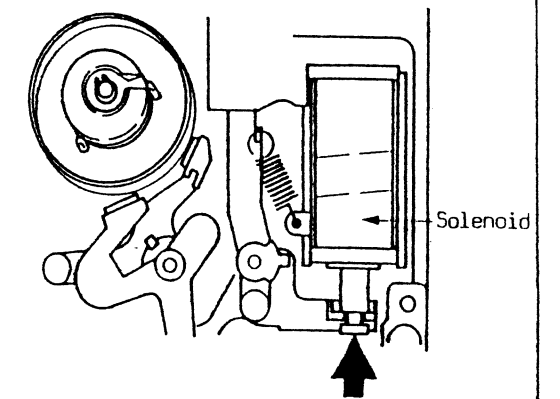


Fig. 6

I. How to place the Cassette Holder in the Down Condition without a Cassette Tape

In the Cassette Holder up condition, the VCR can not be operated, even if Service Test Point (TP6001) is grounded. To place the Cassette Holder in the down position without a cassette tape use the following procedure.

1. Hold the Lock Arm with right thumb until the Cassette Holder Unit clears the Locking Tab of the Rear Frame Unit.
2. Press the Sub Holder Unit into the loading condition with left thumb as shown in Fig. 7.
3. After clearing the Locking Tab, the Cassette Holder Unit will move into down position by itself.

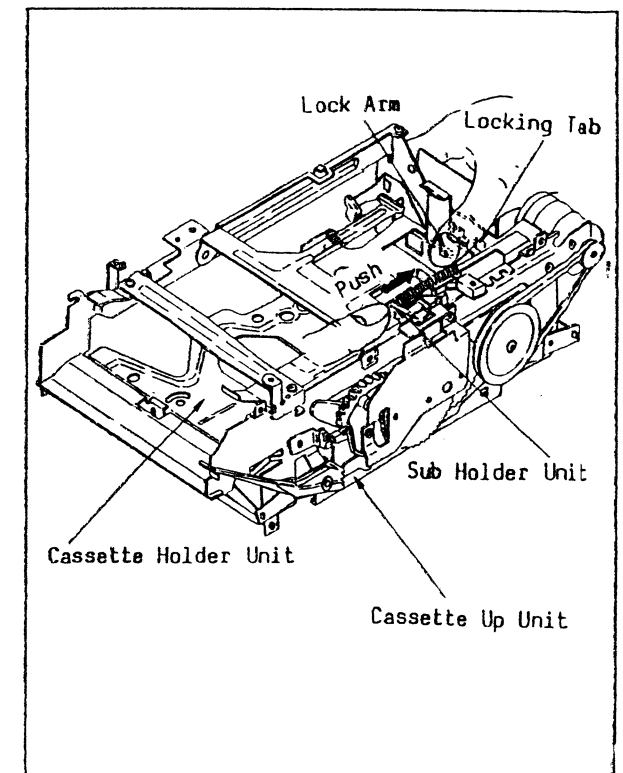


Fig. 7

J. Service of Capstan Rotor Unit

The Capstan Rotor Unit is supplied as a replacement part in a complete unit with a spring loaded Capstan pulley. Do not remove the Retaining Ring on the Capstan Pulley of the Capstan Rotor Unit.

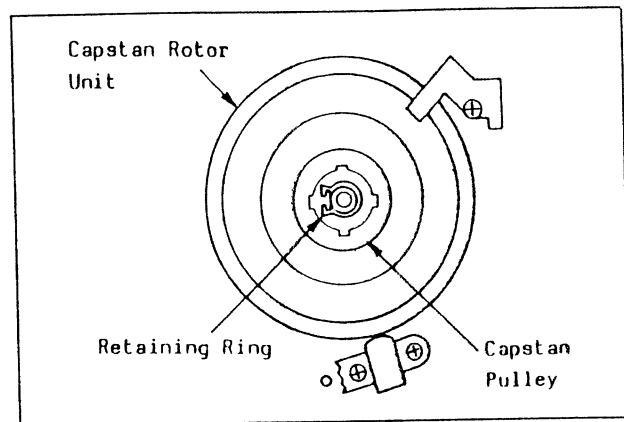


Fig. 8

K. Cleaning with Isopropyl Alcohol 91%

All Isopropyl Alcohol 91% must be removed from the tape path after cleaning by using a dry Head Cleaning Stick (VFK27) or tape damage will occur.

L. How to defeat the Auto Tracking Function

To defeat Auto Tracking Function place a jumper between TP6003 and GND on the System Control Section of the Main C.B.A. in STOP Mode to maintain the Neutral Position.

M. Black Screws on the Chassis

Black Screws are used on the Mechanical Chassis to identify screws that require adjustment.

N. Service of RF Converter Unit

Since the RF Converter Unit has already been adjusted at the factory. Do not try to adjust the 4.5MHz (F) Crystal Oscillator Frequency Control.

O. Set Tracking to the Neutral Position

Eject and reinsertion of Tape will access the Neutral Tracking position.

P. How to read the Disassembly / Assembly Procedures

(For Cabinet Part)

STEP / LOC. No.	PART	REMOVAL		
		Fig. No.	REMOVE *UNLOCK/RELEASE/ UNPLUG/UNCLAMP/ UNSOLDER	Note
①	Top Cover	02	2(S-1)	...
②	Front Panel Ass'y	03	*P4201, *P4201 (S-2)	...

① ③ ⑤ ⑥

(For Mechanical Part)

STEP/ LOC. No.	START -ING No.	PART	REMOVAL		INSTALLATION	
			Fig. No.	REMOVE * UNHOOK / UNLOCK / RELEASE / UNPLUG / UNSOLDER	ADJUSTMENT # CONDITION	
①	1	PRESSURE CAM CAP	T	DM1 DM4	* (L-1)	.....
②	1	PRESSURE ROLLER ARM UNIT	T	DM1 DM4	.....	(+) <Note 1>
③	2	PRESSURE ROLLER LIFT CAM	T	DM1 DM4	.....	See, Alignment Procedures for Mechanism Item 13-8
④	3	PRESSURE REDUCTION GEAR	T	DM1 DM4	.....	(+) See, Alignment Procedures for Mechanism Item 13-2
⑤	5	SETTING PLATE	T	DM1	(S-1)	See, Fig. A2.
⑥	6	SWITCH CAM GEAR	T	DM1 DM4	2(C-1), *2(P-1), * (P-2) <Note 2>	(+) See, Setting Condition in Fig. DM4

①

②

③

④

⑤

⑥

⑦

- ① : Order of steps in Procedure
When reassembling, perform the step(s) in the reverse order.
These numbers are also used as the identification (location) No. of parts in Figures.
- ② : Starting No. followed by corresponding part which can be removed at this stage.
See example below.
Example : Pressure Cam Cap can be removed without removing any other parts because the STEP/LOC. No. and the STARTING No. are the same.
But Pressure Roller Arm Unit can be removed only after removing Pressure Cam Cap (No. ①)
- ③ : Part to be removed or installed.
- ④ : Location of part.
T=Top; B=Bottom
- ⑤ : Fig. No. showing Procedure or Part Location.
- ⑥ : Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped or unsoldered.
P=Spring; W=Washer
C=Cut Washer; R=Retaining Ring
N=Nut; S=Screw
* = Unhook, unlock, release, unplug or unsolder
2(C-2)=2 Cut Washers (C-2)
- ⑦ : Adjustment information for installation.
= Condition for adjustment
(+) : Refer to Exploded Views for Lubrication information.

T. Voltage Measurement

1. Voltage Chart

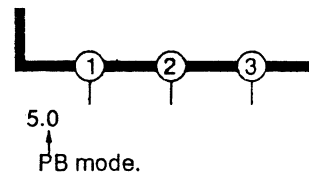
a. Color bar signal in PLAYBACK mode.

b. - - - - : Unmeasurable or unnecessary to measure.

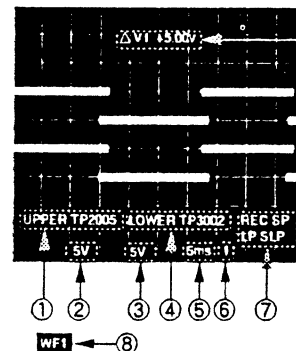
2. Schematic Diagram

a. Audio Section monoscope signal in PB mode.

b. Other Sections color bar signal in PB mode.



U. How to Read Waveform



- ① Connecting Point
- ② Volts/Div
- ③ Volts/Div
- ④ Connecting Point
- ⑤ Time/Div
- ⑥ Trigger Channel of the scope
- (1: UPPER, 2: LOWER)
- ⑦ Operation Mode of VCR
- ⑧ Waveform Point on Schematic
- ⑨ $\Delta V1$: Peak to Peak.

V. Indication for Zener Voltage of Zener Diodes

The Zener Voltage of Zener Diodes are indicated as such on schematic Diagrams.

Example: (6.2V)...Zener Voltage

W. "O" Marks on C.B.A. layout indicate

"O" indicates the connection point between the Foil Side and the Component Side the C.B.A.

X. How to Identify Connectors on Schematic Diagram

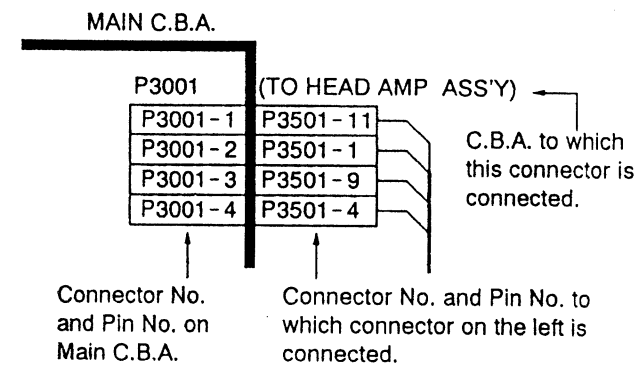
Each connector is labeled with a connector No. and Pin No. indicating what it is connected to, in other words, its counter part.

Connections between large P.C.B.'s and small circuit Boards are illustrated on the large P.C.B. schematics.

Use the interconnection schematic diagram to find the connections between associated connectors.

Example:

The connections between C.B.A.s are as shown below.



4.3. MECHANICAL ADJUSTMENT PROCEDURES

1. DISASSEMBLY OF CABINET PARTS

1. DISASSEMBLY FLOW CHART

This flow chart indicates the disassembly steps of the cabinet parts and the P.C. Boards in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in the reverse order. Bend, route and dress the Flat Cables as they were originally.

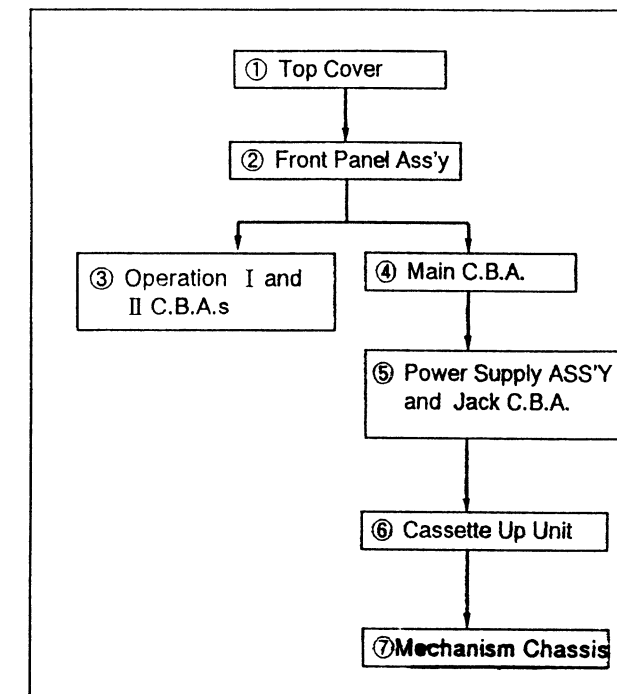


Fig. D1

2. DISASSEMBLY METHOD

STEP /LOC. No.	PART	REMOVAL		
		Fig. No.	REMOVE * UNLOCK/RELEASE/ UNPLUG/UNCLAMP/ UNSOLDER	Note
①	Top Cover	D2	2(S-1)	- - -
②	Front Panel Ass'y	D3	* P4201, * P6002, (S-2)	- - -
③	Operation I and Operation II C.B.A.s	D4	3(S-3), 5(S-4), * P7551	- - -
④	Main C.B.A.	D5	4(S-5), Shield Sheet, (S-6), (S-7), (W-1), Connectors, Clamper	- - -
⑤	Power Supply Ass'y and Jack C.B.A. Unit	D6	* P1301, (S-8), 2(S-9), * P1001	- - -
⑥	Cassette Up Unit	D7	(S-10), (S-11), P.C.B. Angle-R, 3(S-12), * (L-1)	1
⑦	Mechanical Chassis	D7	Screw Covers, 2(S-13), 2(S-14), (S-15)	2

List of Abbreviations :

2(S-1)=2 Screws (S-1)
(L-1)=Locking Tab (L-1)
(W-1)=Washer (W-1)

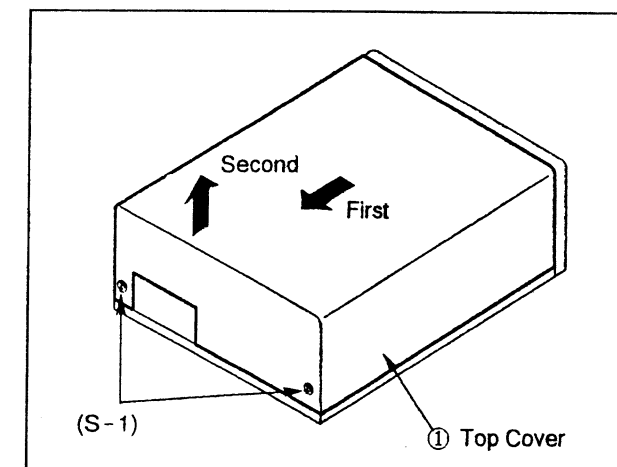


Fig. D2

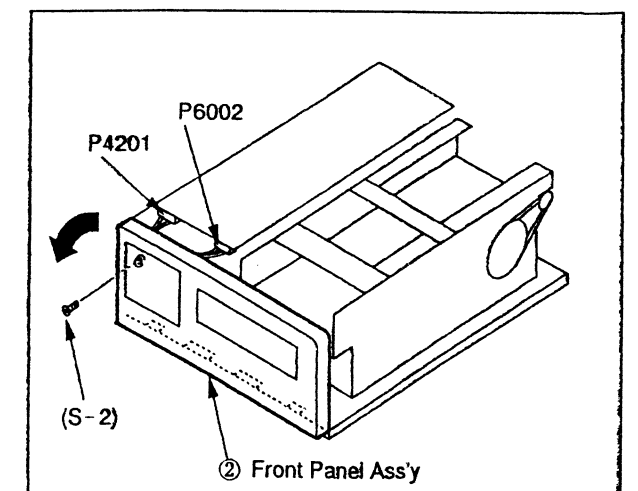


Fig. D3

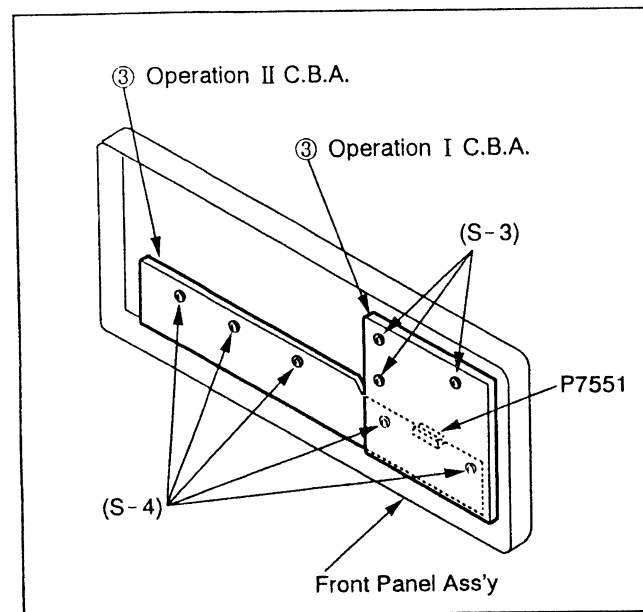


Fig. D4

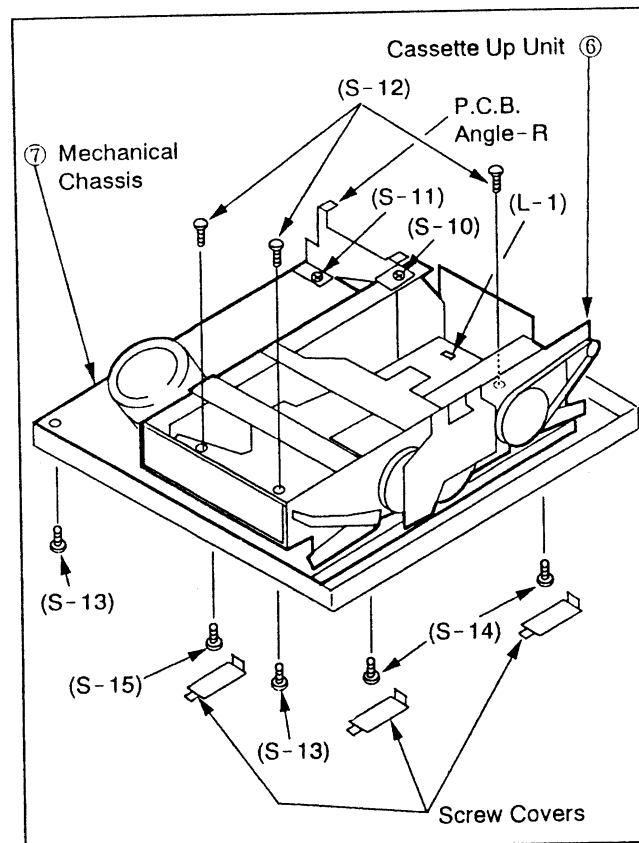


Fig. D7

Reference <Note> in Table 2 :

1. When reinstalling the Cassette Up Unit, take care so as not to place the Position Detect Switch of the Cassette Up Unit onto the Switch Cam Gear.
2. 1) Gently lift the Mechanical Chassis from the Bottom Case.
2) When handling Mechanical Chassis, do not touch mechanical parts on it.

CAUTION :

When reinstalling the Mechanical Chassis, at first, position the left and right rear corners of the Chassis, then position other corner.

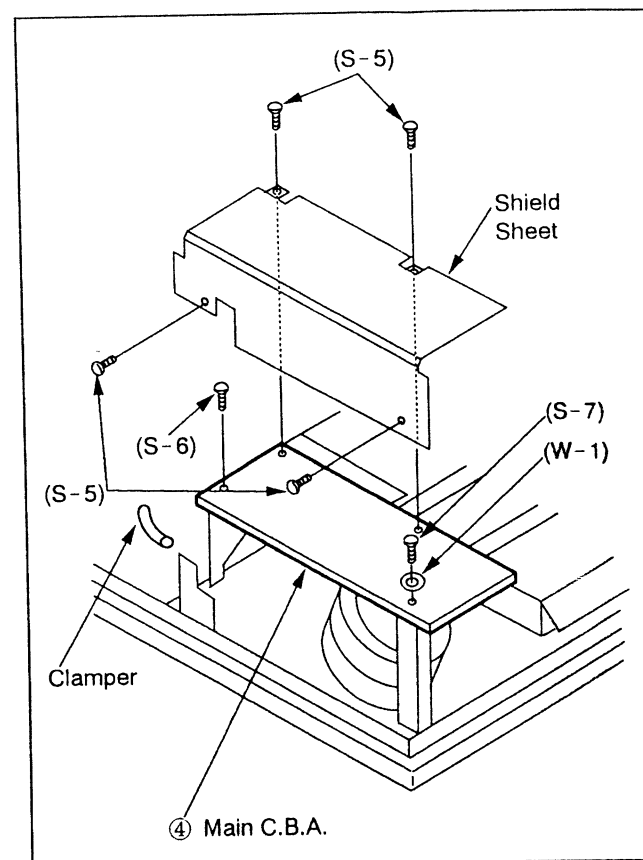


Fig. D5

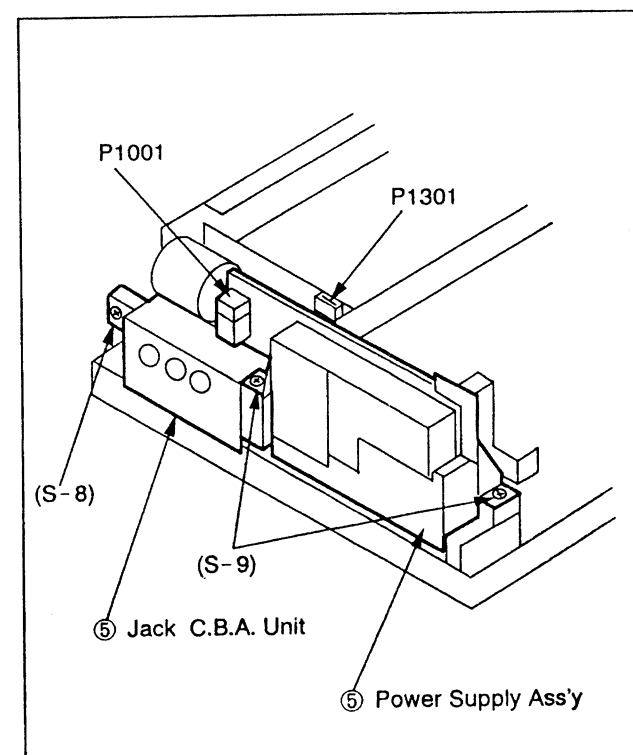


Fig. D6

2. PROCEDURE FOR CLEANING UPPER CYLINDER UNIT

1. Position the Video Head to permit access for cleaning, and hold the Upper Cylinder to keep it from turning while cleaning.
2. Gently rub the Video Heads in the direction of tape travel with a Head Cleaning Stick moistened with Isopropyl Alcohol 91%.
3. Repeat for the other Video Heads.

CAUTION:

All Isopropyl Alcohol 91% must be removed from the tape path after cleaning by using a dry Head Cleaning stick or tape damage will occur.

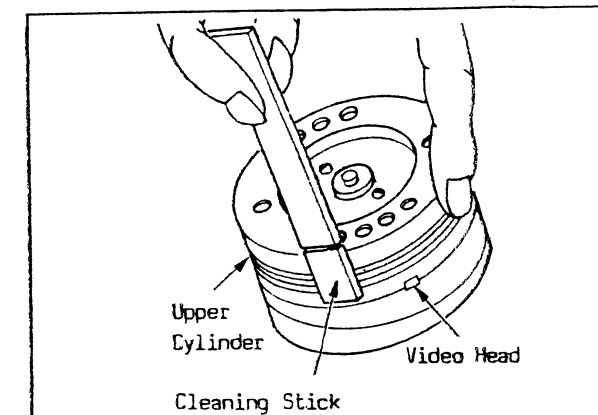


Fig. M1

Note:

1. Do not rub vertically.
2. Do not apply any pressure to the head. If contaminant is not easily removed, continued gentle wiping will usually remove it.
3. Clean the Cylinder surface with Isopropyl Alcohol 91% if fingerprints are present after cleaning the Video Head. See Caution above.

3. ADJUSTMENT PROCEDURES

1. REPLACEMENT OF UPPER CYLINDER UNIT

1-1. REMOVAL OF UPPER CYLINDER UNIT

Work with extreme care when removing or replacing the Upper Cylinder Unit. Do not touch Video Heads during servicing.

1. Unsolder only the Lead Pins which are indicated by '↑↑↑' marks as shown in Fig. M2.
2. Remove 2 Screws with Washers (A) and gently lift the Upper Cylinder Unit from the shaft.

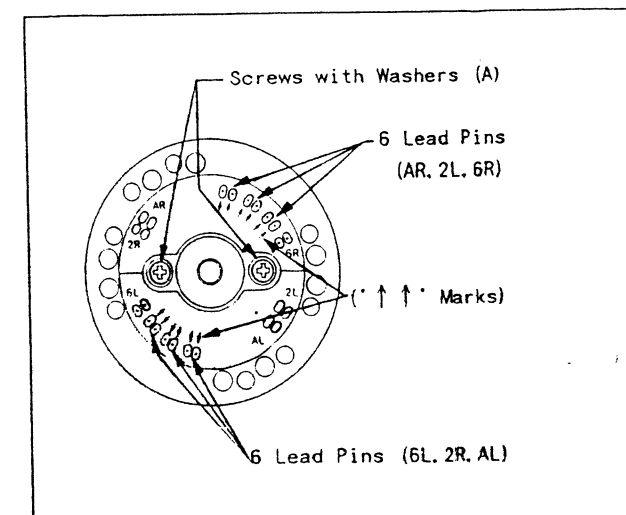


Fig. M2

1-2. CLEANING OF D.D. CYLINDER SHAFT AND THE SURFACE

1. Before reinstalling a new unit, clean the D.D. Cylinder Shaft and the surface that engages with the Upper Cylinder with a soft cloth dampened with Isopropyl Alcohol 91% in Fig. M3. See Caution under 2. Procedure for Cleaning Upper Cylinder Unit.

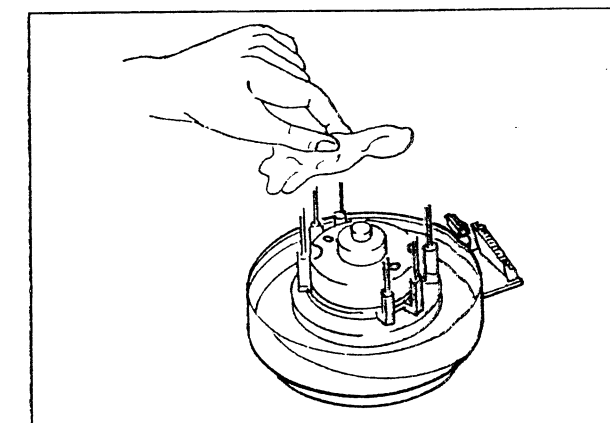


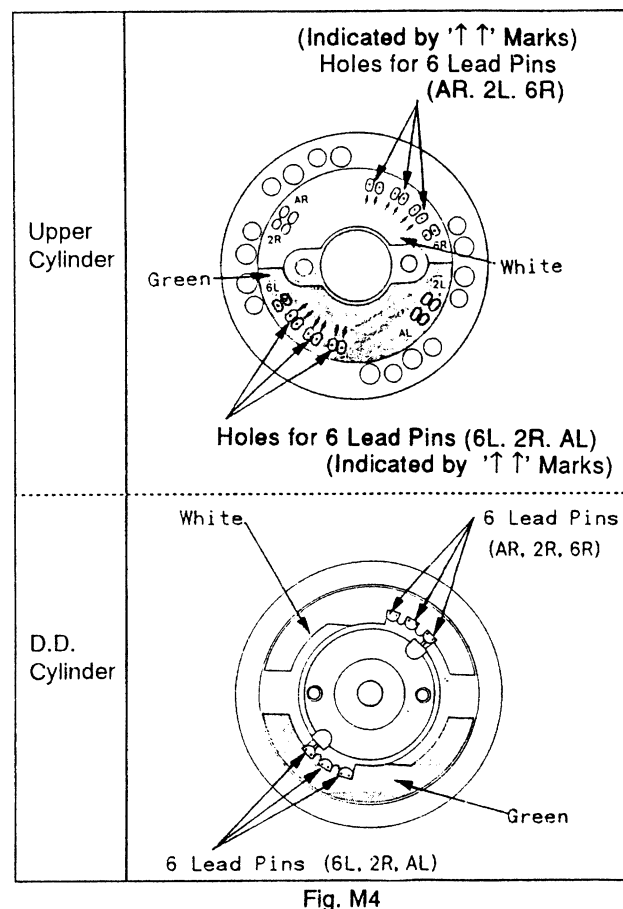
Fig. M3

1-3. REPLACEMENT OF UPPER CYLINDER UNIT

1. Install the new Upper Cylinder Unit carefully so that the Lead Pins are properly matched on the Head Relay Board. For details on the installation position, refer to Fig. M4.

Note:

1. Install the Lead Pins with extreme care so as not to damage them. Install the Upper Cylinder so that the color of the P.C.B. on the Upper Cylinder matches the color of the P.C.B. on the D.D. Cylinder (White to White, Green to Green)



2. Tighten 2 Screws with Washers (A) shown in Fig. M2 and resolder the Lead Pins to the Head Relay Board.
3. Clean the Upper Cylinder with a deerskin swab (Cleaning Stick) saturated with Isopropyl Alcohol 91%. See Caution under 2. Procedure for Cleaning Upper Cylinder Unit.

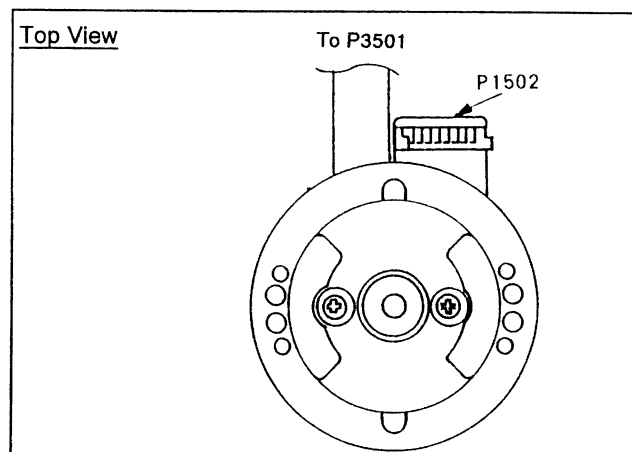
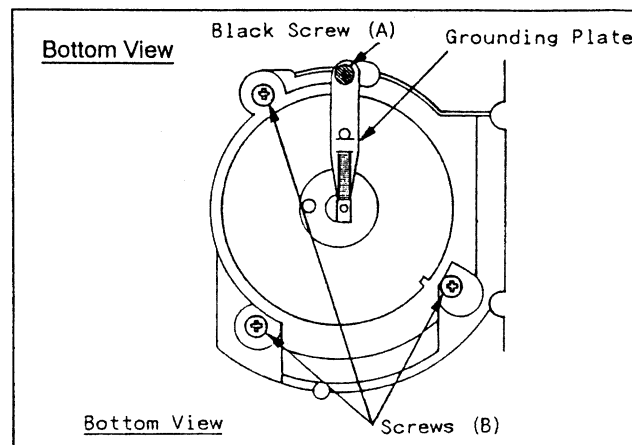
Note:

Upon completion of replacement, confirm performance. If required, perform "TAPE INTERCHANGEABILITY ADJUSTMENT", especially "HORIZONTAL POSITION ADJUSTMENT OF A/C HEAD".

2. REPLACEMENT OF D.D. CYLINDER UNIT

Work with extreme care when removing or replacing the D.D. Cylinder Unit. Do not touch Video Head during servicing.

1. Remove the Mechanical Chassis from the Bottom Case.
2. Place the Unit up side down.
3. Remove Black Screw (A) and the Grounding Plate.
4. Disconnect Connectors P3501 on the Main C.B.A. and P1502 on the D.D. Cylinder Unit.
5. Remove 3 Screws (B) and then lift the D.D. Cylinder Unit slowly from the top side.



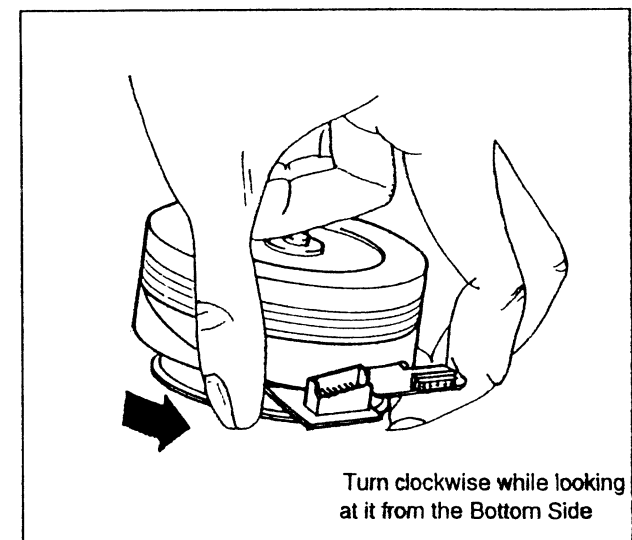
Note:

Since there is very little clearance between D.D. Cylinder Unit and chassis, remove the D.D. Cylinder Unit gently and carefully.

8. Reinstall the new D.D. Cylinder Unit on the chassis by reversing the procedure previously described.

Note:

1. Reinstall the new D.D. Cylinder Unit so that the 2 projections on the chassis meet the 2 holes on lower surface of the D.D. Cylinder. Then fit the new D.D. Cylinder Unit to the chassis by turning it, refer to Fig. M5-3. Hold the D.D. Cylinder with extreme care so as not to touch the Heads or the tape path on the Cylinder. If they are touched then clean it with a deerskin swab (Cleaning Stick) saturated with Isopropyl Alcohol 91%. See Caution under 2. Procedure for Cleaning Upper Cylinder Unit.



2. Upon completion of replacement procedure, confirm performance. If any further maintenance is required, perform "TAPE INTERCHANGEABILITY" with the alignment tape.
3. Adjustment of the Grounding Plate is required after installation. Refer to Item 3.

3. CONFIRMATION OF GROUNDING PLATE INSTALLATION POSITION

Purpose:

To optimize the position of Grounding Plate.

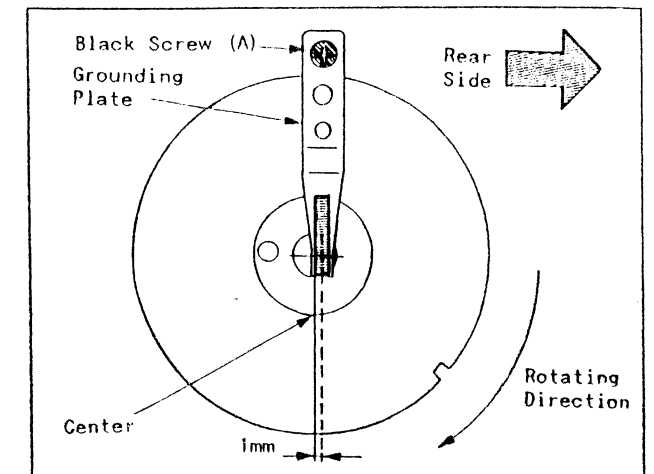
Symptom of Misadjustment:

May cause Cylinder rotating buzz.

1. Remove the Mechanical Chassis from the Bottom Case.
2. Stand the Mechanical Chassis with left side down.
3. Check to see if the Grounding Plate is properly set in a position just less than 1mm (but not more than 1mm) as measured from the center of the plate to the center of the Cylinder Shaft as shown in Fig. M6. If required, adjust the Grounding Plate position by loosening Black Screw (A).

Note:

Never install the Grounding Plate in the opposite position (on the front side of the center of the Cylinder Shaft), but always within a maximum of 1mm to the rear side of the center of this shaft.



4. POSITION ADJUSTMENT OF TENSION POST (PRELIMINARY)

Purpose:

To feed a constant tension to the tape so that tape runs with stability, by performing a preliminary adjustment.

Symptom of Misadjustment:

- 1) If the adjusted value is below the specification, the tape tension is not sufficient, thus causing a tape slack to occur.
- 2) If the adjusted value is above the specification, the tape tension is too high, thus causing tape damage to occur.

* Equipment Required :
2mm Hex. Wrench

1. Remove the Cassette Up Unit.
2. Connect TP6001 and GND on the System Control Section of the Main C.B.A. through a jumper wire.
3. Push the PLAY button to complete loading operation sequence.
4. As soon as loading is completed, disconnect the AC plug.
5. Insert the Hex. Wrench (2mm) into the nut on the Tension Band Fastener and adjust it (only counter-clockwise) as indicated by the arrow so that the outside edge of the Tension Post lines up with the outside of the P1 Post as shown in Fig. M7 (as viewed looking down the edge of the Cassette Side Plate (L) Unit).
6. Remove the Hex. Wrench (2mm), and the jumper (TP6001 - GND), plug in AC Cord, then complete unloading operation sequence.

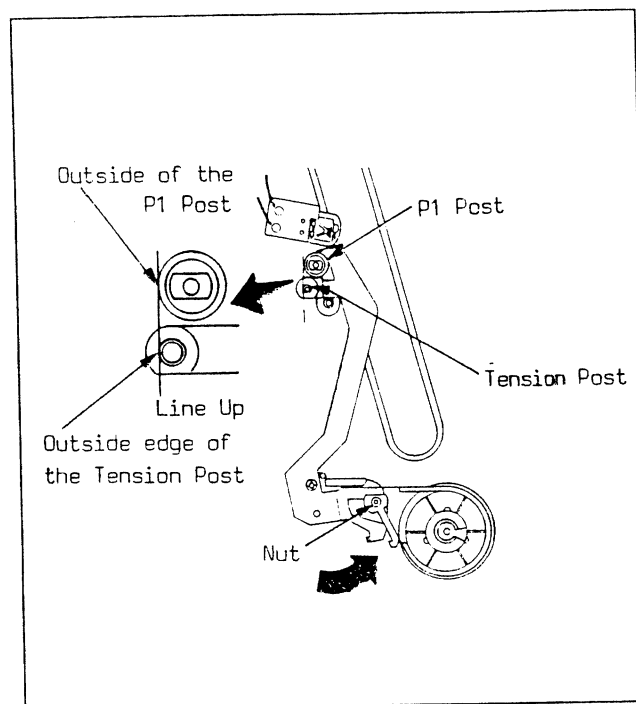


Fig. M7

5. MEASUREMENT AND ADJUSTMENT OF BACK TENSION

Purpose :

To fine adjust the Back Tension so that the tape runs stable with a constant tension.

Symptom of Misadjustment :

- 1) If the tape tension is less than the specified value, the tape can not come into proper contact with the Video Heads, resulting in poor picture playback.
- 2) If the tape tension is too high, the tape will soon be damaged.

A : Measurement Procedure

* Equipment Required
Back Tension Meter (4822 395 90584)
VHS Cassette Tape (120 Minute Tape)

* Specification : 23~27g

1. Remove the Top Cover.
2. Play back a cassette tape from its beginning for approx. 10 to 20 seconds, until the tape's movement has stabilized.
3. Insert Tension Meter in tape path and confirm reading.
4. If the reading is out of specification, perform the adjustment procedure.

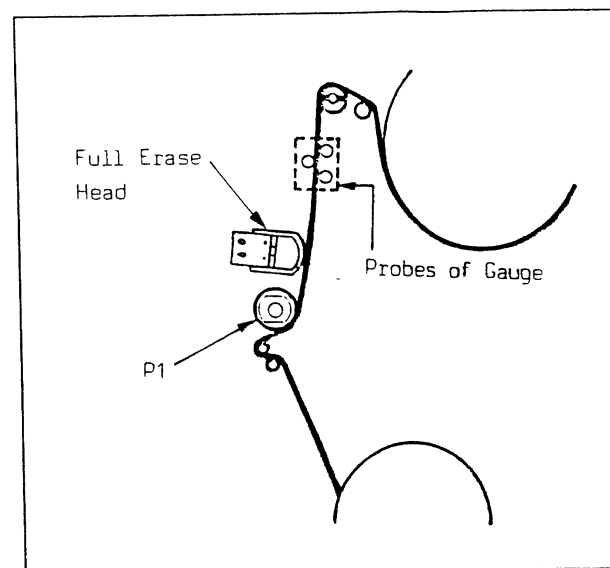


Fig. M8

Note :

1. Make sure that the three probes of the meter are all in solid contact with tape, but out of contact with any other parts while measuring.
2. It is recommended that measurements be taken three times because the tension meter is very sensitive to external vibrations.

B : Adjustment Procedure

1. Remove the cassette tape. Then re-position Tension Spring on the Tension Arm Base Teeth in either direction as indicated by the arrow to obtain the specified tension.
2. Re-position Tension Spring toward front side to increase tension, toward rear side to decrease tension.
3. Reinstall a cassette tape and verify tension with the meter once again.
4. Reinstall the Top Cover.

Note :

If the specified tension is not obtained even if the Tension Spring is re-positioned, replace the Tension Spring, replace the Tension Band, clean the Reel Table or make sure if there is no dust between Tension Band and Reel Table.

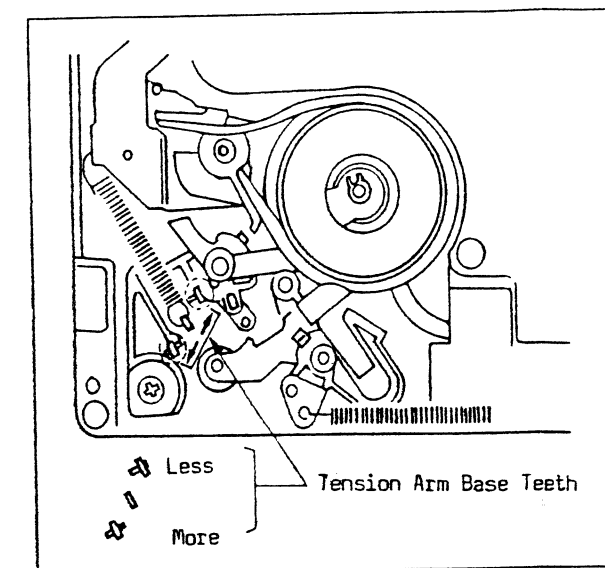


Fig. M9

6. HEIGHT ADJUSTMENT OF REEL TABLES

Purpose :

To properly align the height of the tape wound on the Supply and Take-Up Reels.

Symptom of Misadjustment :

If the height of the tape is not properly aligned, the tape will eventually be damaged.

* Equipment Required:

Post Adjustment Plate 4822 395 80395
Reel Table Height Fixture.....4822 395 80394

* Specification..... $0 \pm 0.1\text{mm}$

1. Remove the Cassette Up Unit.
2. Place the Post Adjustment Plate over the reels, and put the fixture on it. Set the fixture to zero "0" and ensure that the foot of the fixture touches the cut-out portion of the plate.

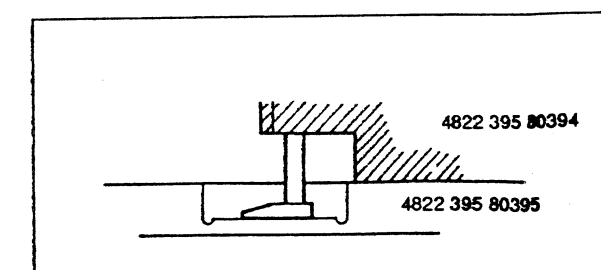


Fig. M10-1

3. Then measure the top portion of the Reel Table and compare the difference against the result of the measurement taken in the above step. Do the same for the other reel table.

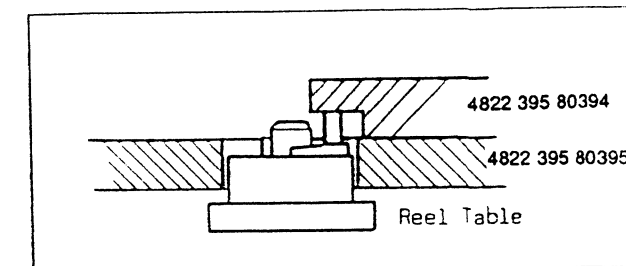


Fig. M10-2

4. If the difference is more than 0.1mm (higher or lower), adjust the height of reel table to obtain the specified height.
5. For adjustment, change the poly washer located under the reel table. (The washer is available in only one size of 0.13mm thick)
6. Reinstall the Cassette Up Unit and the cabinet parts.

7. CONFIRMATION OF TAKEUP SHAFT HOLDER ASS'Y INSTALLATION POSITION

Purpose :

To properly set the Takeup Shaft Holder ASS'Y position.

Symptom of Misadjustment :

The tape will be damaged.

1. Lift the Mechanical Chassis slightly from the Bottom Case. Turn Center Pulley Unit clockwise until post 2 and 3 are partially loaded (Refer to SERVICE NOTES AND CAUTIONS Item H).
2. Check to see if the Takeup Shaft Holder ASS'Y is properly set in a position just less than or equal to 0.2mm as measured from the right side to the center of the Shaft Holder Plate as shown in Fig. M11. If required, adjust the Takeup Shaft Holder ASS'Y position by loosening Black Screw with Washer (A).

Note:

Never install the Takeup Shaft Holder ASS'Y in the opposite position (on the left side of the center of the Shaft Holder Plate), but always within a maximum of 0.2mm to the right side of the center of this plate.

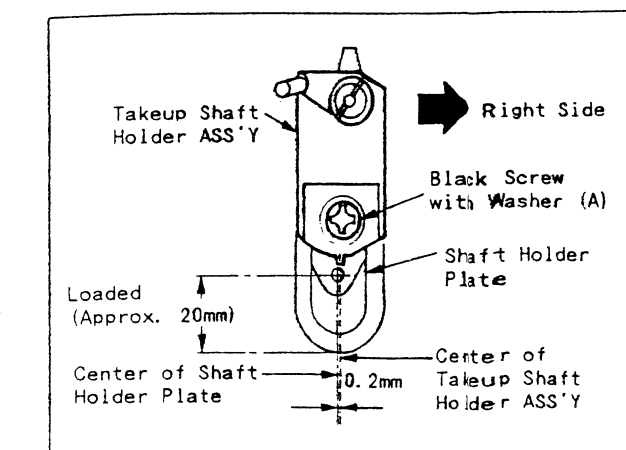


Fig. M11

8. HEIGHT ADJUSTMENT OF TAPE GUIDE POSTS (PRELIMINARY ADJUSTMENT)

* Equipment Required:
 Lock Screw Wrench.....4822 395 50429
 Post Adjustment Plate.....4822 395 80395
 Reel Table Height Fixture.....4822 395 80394
 Post Adjustment Screwdriver.....4822 395 50275

8-A. HEIGHT ADJUSTMENT OF P2 AND P3

Purpose :

To properly align the position of the tape with the Cylinder Lead so that the tape runs with stability.

Symptom of Misadjustment :

- 1) Since the Envelope Waveform Signal cannot be tracked properly, the Playback picture will be poor.
- 2) Since the tape will not run stable, the tape will eventually be damaged.
- 3) Tape interchangeability is poor.

1. Remove the Cassette Up Unit. Then install the Adjustment Plate.

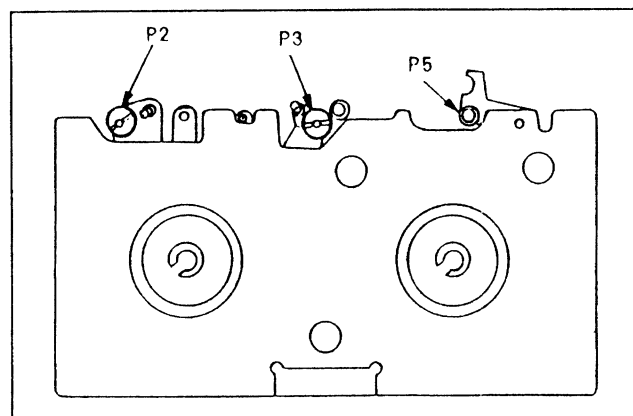


Fig. M12-1

2. First, lower all posts to match the height condition as shown in Fig. M12-2.

(The upper edge of the lower tape guide on each post should be below the bottom of the foot. Loosen Black Lock Screws located at lower portion of posts (P2 & P3) using Lock Screw Wrench, then turn the posts with Post Adjustment Screwdriver.

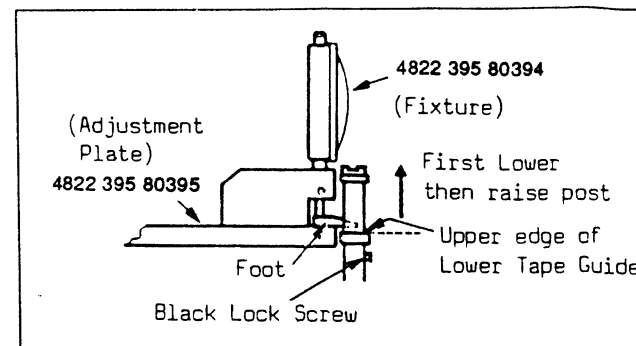


Fig. M12-2

3. Place the fixture on the Adjustment Plate and fit the foot to the Adjustment Plate as shown in Fig. M12-2. (The foot of the fixture should be fully lowered until it touches the plate.)
4. Set the fixture to zero "0" and slowly raise the post until it just touches the foot. When the foot touches the post, it should fit as shown in Fig. M12-3 (b). For adjustment of P2 and P3, use the Post Adjustment Screwdriver.

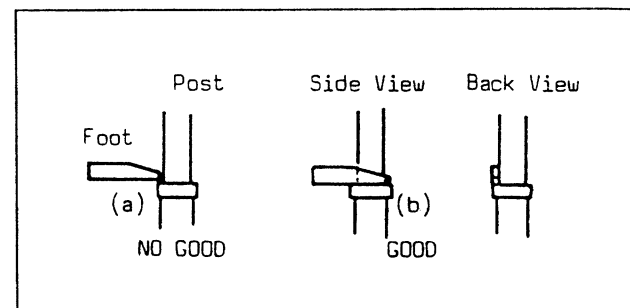


Fig. M12-3

Note:

Upon completion of adjustment, tighten the Black Lock Screws on P2 and P3 using the Lock Screw Wrench.

8-B. HEIGHT ADJUSTMENT OF P5 ARM UNIT

Purpose :

To properly align the Phase and Speed Controls during the CUE/REVIEW Modes and perform the CUE/REVIEW operations without any small additional noise in the picture.

Symptom of Misadjustment :

- 1) Noticeable noise appears in the picture.
- 2) The tape will eventually be damaged.

* Equipment Required:
 Post Adjustment Plate.....4822 395 80395
 Reel Table Height Fixture.....4822 395 80394
 Nut Driver (5.5mm)

* Specification : 0 (+0, - 0.08) mm

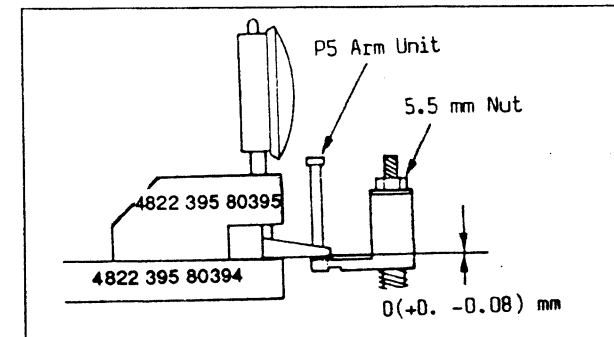


Fig. M12-4

1. Place the Post Adjustment Plate over the Reels, and put the Fixture on it. Set the Fixture to Zero "0" when the foot just touches the Post Height Adjustment Plate.
2. Slightly raise the P5 post above the plate by turning the 5.5mm Nut counterclockwise. Place the foot on the post as shown in Fig. M12-4.
3. Then slowly turn the 5.5mm Nut clockwise until the fixture reads the specified height.
4. Remove the Post Adjustment Plate. Reinstall the Cassette Up Unit.

Note:

Upon completion of above procedure, play back the tape and confirm that the tape runs properly without curling between lower and upper limits of P5 Post. Also confirm that the tape is running smoothly. If adjustment is required, slightly turn the 5.5mm Nut until the curling smoothes out.

9. TAPE INTERCHANGEABILITY ADJUSTMENT(FINAL ADJUSTMENT)

Note :

To perform these adjustment/confirmation procedures, make sure that the Tracking Control is set in the Neutral position.

* Equipment Required:
 Dual Trace Oscilloscope
 PAL VHS Alignment Tape 4822 397 30103
 Post Adjustment Screwdriver 4822 395 50275
 H-Position Adjustment Fixture 4822 395 50428
 Lock Screw Wrench.....4822 395 50429
 7mm Nut Driver

9-A. CONFIRMATION OF TAPE TRAVEL

Purpose :

To make sure that the tape run is well stabilized.

Symptom of Misadjustment :

If the tape travels with instability, the tape will be damaged.

1. Play back a cassette tape and confirm that the tape travels without curling at the upper and lower guides on posts P2 and P3.

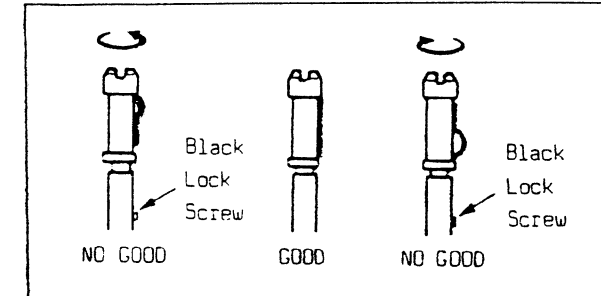


Fig. M13

2. If curling is apparent, adjust the height of posts by turning the top of post with the Post Adjustment Screwdriver. (for P2 & P3)

Note:

Before turning P2 and P3, slightly loosen the Black Lock Screw using the Lock Screw Wrench.

9-B. CONFIRMATION OF A/C HEAD HEIGHT

Purpose :

To make sure the tape runs properly along the Control Head.

Symptom of Misadjustment :

If the control signal is not properly picked up, Servo Operation can not be achieved.

This confirmation is required when the A/C Head is replaced and for a preliminary height adjustment. For final adjustments, perform items 9-C and 9-D.

1. Looking at the lower edge of the Control Head with the tape in motion, ensure that the lower edge of the tape runs 0.25mm above the lower edge of the control head. If it doesn't, turn 7mm Nut (A) slightly in either direction as necessary to correct it. Turn clockwise to lower the head and counterclockwise to raise it.

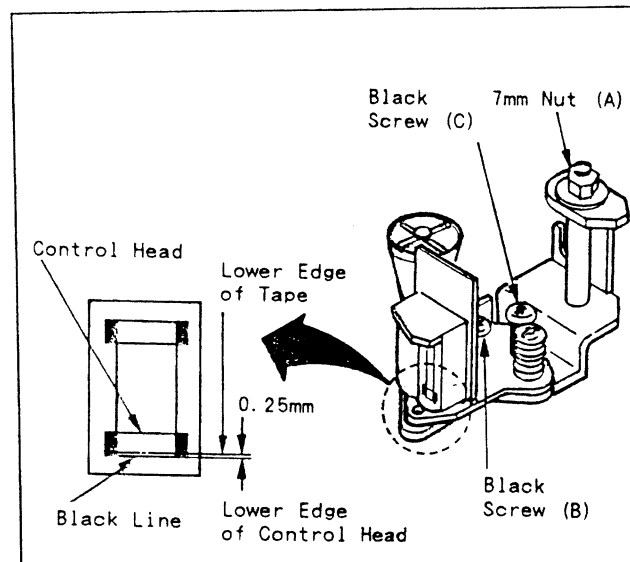


Fig. M14

9-C. CONFIRMATION OF TILT OF A/C HEAD

Purpose :

To confirm that the tape run is well stabilized. In particular, confirm that the tape properly picks up the Audio Signal at the upper part and the Control Signal at the lower part.

Symptom of Misadjustment :

If the tilt of the A/C Head is poorly adjusted, the tape will be eventually damaged.

1. Play back a Cassette tape and confirm that the tape runs properly between lower and upper limits of P4 post. Also confirm that the tape is running smoothly.
2. If adjustment is required, turn Black Screw (C), in Fig. M14, clockwise until curling is apparent at lower edge of P4. Then turn Black Screw (C) counterclockwise until the curling smooths out.

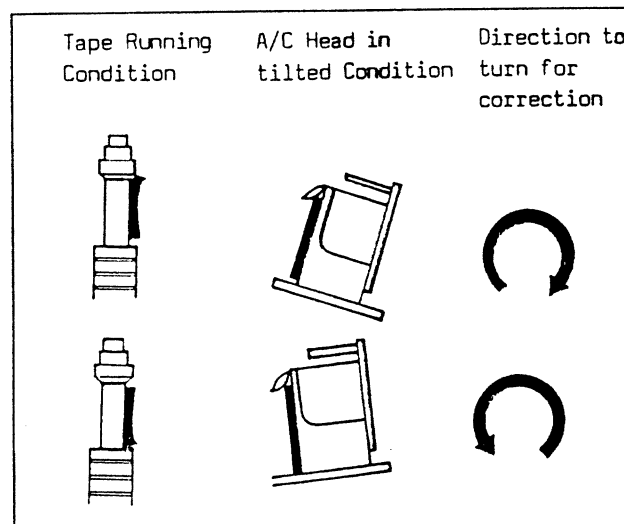


Fig. M15

9-D. HEIGHT AND AZIMUTH ADJUSTMENT OF A/C HEAD

Purpose :

To adjust the position and height of the A/C Head so that it meets the tape tracks properly.

Symptom of Misadjustment :

If the position of the A/C Head is not properly adjusted, the Audio S/N Ratio is also poor.

1. Connect the oscilloscope to the audio output jack on the rear of the deck.
2. Play back the monoscope portion (6kHz, Mono) of the alignment tape.
3. Adjust Black Screw (B) on the head base in Fig. M14 so that the output level is at a maximum.

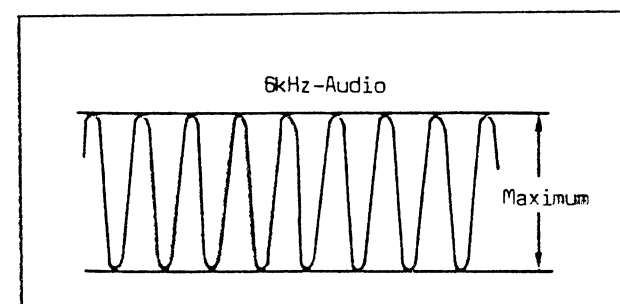


Fig. M16

4. Readjust 7mm Nut (A) shown in Fig. M14 for maximum output.
5. Disconnect the oscilloscope.

9-E. HORIZONTAL POSITION ADJUSTMENT OF A/C HEAD

Purpose :

To adjust the Horizontal Position of the A/C Head.

Symptom of Misadjustment :

If the Horizontal Position of the A/C Head is not properly adjusted, maximum envelope can not be obtained at the Neutral Position of the Tracking Control Circuit.

Place a jumper between TP6003 and GND on the System Control Section of the Main C.B.A. to defeat Auto Tracking.

1. Eject the tape and reinsert it again, this will access the Neutral Tracking position. Connect the oscilloscope to TP3002 on the Video Signal Process Section of the Main C.B.A. Use TP6205 as a trigger.
2. Play back the monoscope portion of the alignment tape and confirm that the RF envelope appears, as in Fig. M18-1.
3. If adjustment is required, set the H - Position ADJ. Fixture into the slot of the Adjustment Nut and slowly turn either right or left so that the envelope is at a maximum.

4. Before finding the center of the maximum period of the envelope, rotate the Adjustment Nut back and forth slightly to confirm the limits on either side of the maximum period.
5. Push the Tracking Control UP Button (on the Front Panel Ass'y) several times (count the number of times pushed) until the maximum envelope is reduced to 1/2.
6. Re - set the tracking to the neutral position by ejecting the tape and reinserting it. Push the Tracking Control DOWN Button (on the Front Panel Ass'y) several times (count the number of times pushed) until the maximum envelope is reduced to 1/2.
7. If the number of pushes is not the same, then rotate the adjustment nut back and forth slightly to find the center point. Then repeat the above procedure until the center point is determined.

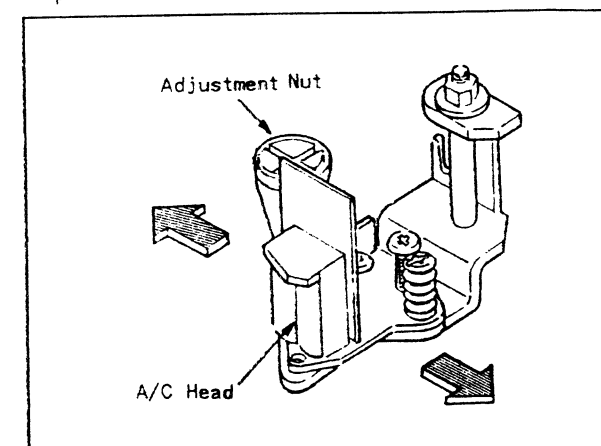


Fig. M17

9-F. CONFIRMATION/ADJUSTMENT OF ENVELOPE OUTPUT

Purpose :

To achieve a satisfactory picture and secure precise tracking.

Symptom of Misadjustment :

If the envelope is output poorly, much noise will appear in the picture. Then the tracking will lose precision and the playback picture will be distorted by any slight variation of the tracking control circuit.

Place a jumper between TP6003 and GND on the System Control Section of the Main C.B.A. to defeat Auto Tracking.

1. Eject the tape and reinsert it again, this will access the Neutral Tracking position. Connect the oscilloscope to TP3002 on the Video Signal Process Section of the Main C.B.A. Use TP6205 as a trigger.
2. Play back the monoscope portion of the alignment tape and adjust the height of posts P2 and P3 watching the scope display so that the envelope becomes as flat as possible. ($V1/V-max \geq 0.7$, $V2/V-max \geq 0.8$)

If adjustment is required, turn top of post with Post Adjustment Screwdriver. For adjustment of P2 and P3, refer to Item 9-A and it's Note.

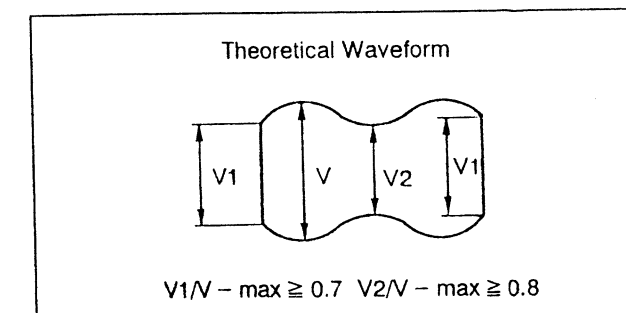


Fig. M18-1

3. When the scope display is as shown in Fig. M18-2, adjust the height of P2 so that the waveform looks like Fig. M18-4.

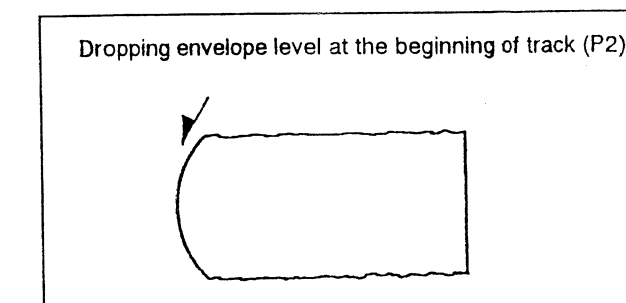


Fig. M18-2

4. When the scope display is as shown in Fig. M18-3, adjust the height of P3 so that the waveform looks like Fig. M18-4.

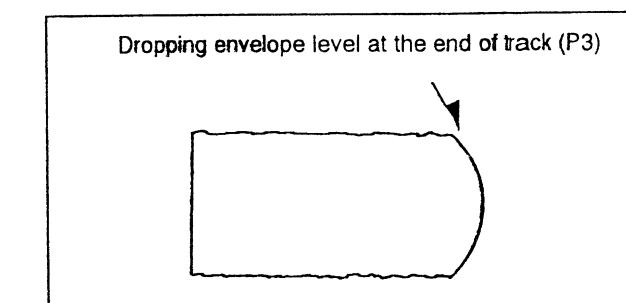


Fig. M18-3

5. When P2 and P3 are adjusted properly, there is no Envelope Drop at the beginning or end of the track as shown in Fig. M18-4. Remove the jumper wire.

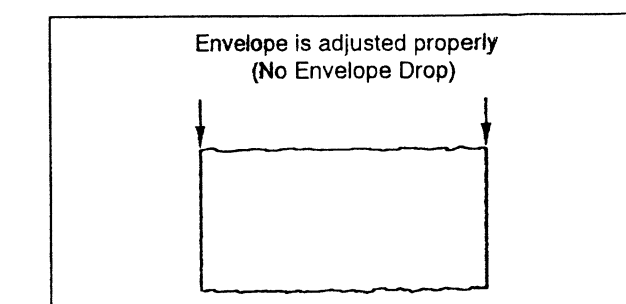


Fig. M18-4

Note:

Upon completion of adjustment of P2 and P3, tighten the Black Lock Screws on P2 and P3 using the Lock Screw Wrench. Then confirm the Horizontal Position of A/C Head by pushing the Tracking Control Up or Down Buttons (on the Front Panel Ass'y) alternately to check the symmetry of the envelope. And if required, perform "Horizontal Position Adjustment of A/C Head".

10. ADJUSTMENT OF FG HEAD GAP

Purpose :

To properly pick up the FG Signal.

Symptom of Misadjustment :

If the FG Signal is not properly picked up, Servo Operation can not be achieved.

* Equipment Required :

Oscilloscope
Fine Adjustment Screwdriver 4822 395 50431

* Specification : 0.1 - 0.13 mm

1. Remove the Mechanical Chassis from Bottom Case. And then place the Mechanical Chassis up side down (Refer to Service Notes and Cautions Item A).
2. Slightly loosen 2 Black Screws (A) and set the Fine Adjustment Screwdriver into Hole (B) as shown in Fig. M19. Turn screwdriver clockwise until the FG Head touches the rotor. Then turn it slightly counterclockwise to the clearance as specified.
3. Tighten 2 Black Screws (A) in Fig. M19.

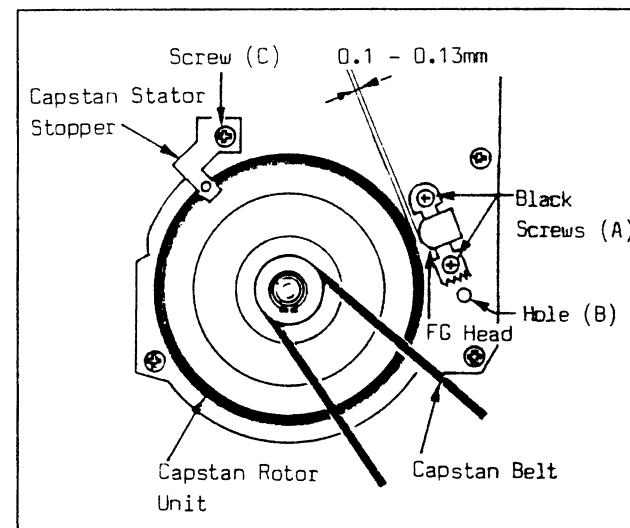


Fig. M19

Note :

1. Do not touch the outside circumference of the rotor surface with any tool and keep magnetic material away from the rotor magnet (especially metal particles).
2. Upon completion of above procedure, confirm that the FG Head output level is more than 10mVp-p, see preparation below. If the level is not more than 10mVp-p, re-adjust the FG Head Gap so that the FG Head output level is more than 10mVp-p.

(Preparation)

- 1) Supply a Video Signal to the Video Input Jack on the rear of the deck.
- 2) Insert a cassette tape and place the unit in SLP recording Mode.
- 3) Connect the oscilloscope to the terminals of the FG Head.

11. REPLACEMENT OF CAPSTAN ROTOR OR STATOR UNIT

1. Remove the Capstan Belt (Fig. M19).
2. Remove Screw (C) and the Capstan Stator Stopper in Fig. M19.
3. Carefully pull out the Capstan Rotor Unit, taking care so as not to lose the 2 Dust Seals as shown in Fig. M20.

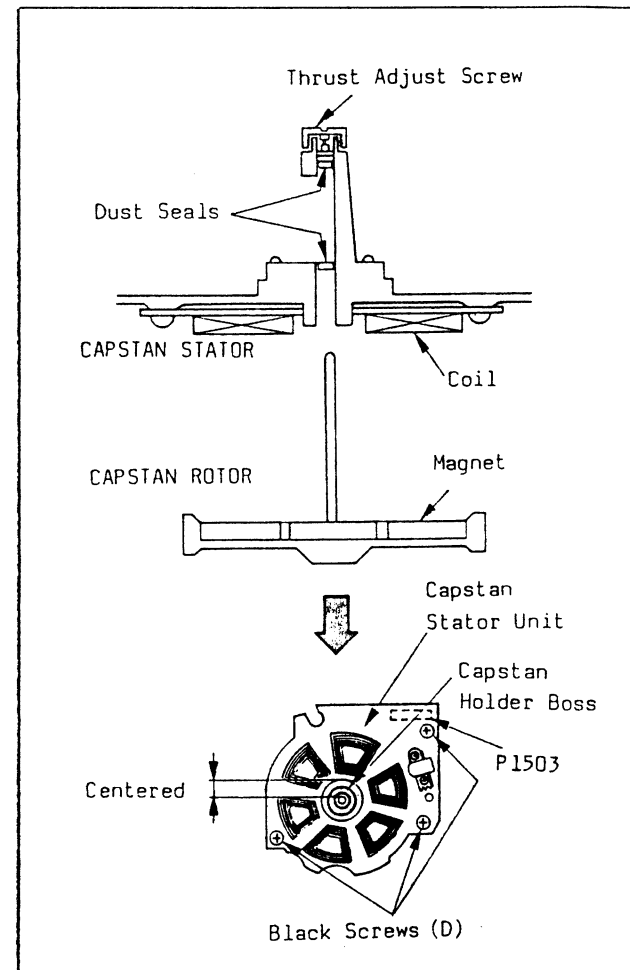


Fig. M20

4. Unplug Connector P1503 on the Capstan Stator Unit. Remove 3 Black Screws (D) and then lift the Capstan Stator Unit.
5. Replace the new Capstan Stator Unit and then tighten 3 Black Screws (D). Plug Connector P1503 on the Capstan Stator Unit.

Note:

When reinstalling the Capstan Stator Unit, the Capstan Holder Boss must be centered within the hole in the Capstan Stator Unit.

6. Before replacement of new Capstan Rotor Unit, loosen the Thrust Adjust Screw completely.
7. Replace the new Capstan Rotor, carefully inserting the 2 Dust Seals as shown in Fig. M20.

Note :

- 1) The Capstan Rotor Unit is supplied as a replacement part in a complete unit with a spring loaded Capstan Pulley. Do not remove the Retaining Ring on the Capstan Pulley of the Capstan Rotor Unit.
- 2) Hold the new Capstan Rotor Unit firmly, when replacing it, so the rotor will not be pulled toward the stator too quickly (due to magnetic force). Placing some paper on the coils before rotor installation may prevent accidental damage to the coils if the above caution is not observed.
- 3) During replacement, do not touch the Capstan Shaft with any hard material like drivers or tweezers.

8. Re-install the Capstan Stator Stopper with Screw (C), in Fig. M19.

....ADJUSTMENT OF THRUST ADJUST SCREW AND DUST SEALS....

9. Re-install the Capstan Belt and while exerting pressure to turn the Center Pulley Unit, tighten the Thrust Adjust Screw slowly until the Capstan Rotor just starts turning.
10. At the point where the Capstan Rotor starts turning, tighten the Thrust Adjust Screw another 180° CW.
11. Upon completion of above procedure, confirm that these 2 Dust Seals are positioned as shown in Fig. M21. And then, wipe off the Capstan Shaft to remove oil, grease and dust.

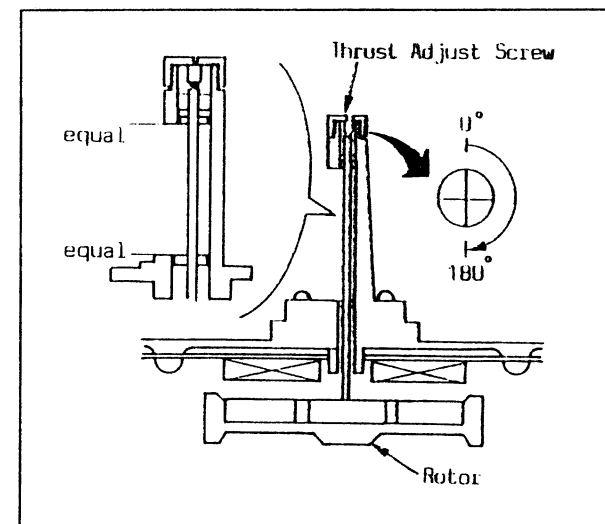


Fig. M21

12. DISASSEMBLY/ASSEMBLY PROCEDURES OF MECHANISM

This procedure starts with the condition that the cabinet parts, Cassette Up Unit and Mechanical Chassis have been removed. Also, all the following procedures for adjustment and part replacement should be performed in STOP Mode. When reassembling, perform the step(s) in the reverse order.

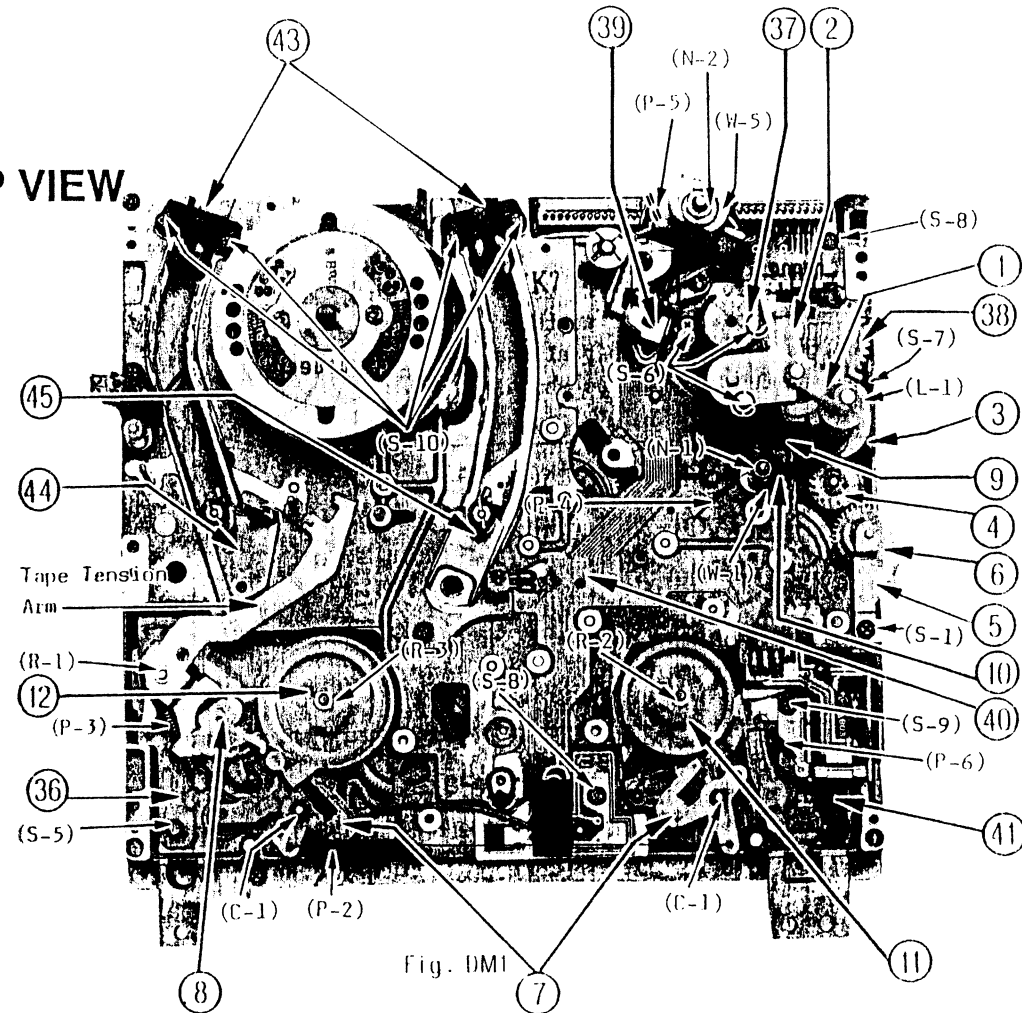
STEP /LOC. No.	START -ING No.	PART	REMOVAL		INSTALLATION
			Fig. No.	REMOVE * UNHOOK/UNLOCK /RELEASE /UNPLUG /UNSOLDER	
①	1	PINCH CAM CAP	T DM1 DM4	* (L-1)	.....
②	1	PRESSURE ROLLER ARM UNIT	T DM1 DM4	.....	(+) < Note 1 >
③	2	PRESSURE ROLLER LIFT CAM	T DM1 DM4	.....	See, Alignment Procedures for Mechanism Item 13-8.
④	3	PRESSURE REDUCTION GEAR	T DM1 DM4	.....	(+) See, Alignment Procedures for Mechanism Item 13-2.
⑤	5	SETTING PLATE	T DM1	(S-1)	See, Fig. A2.
⑥	6	SWITCH CAM GEAR	T DM1 DM4	.....	(+) See, Alignment Procedures for Mechanism Item 13-6.
⑦	7	MAIN BRAKE ASS'Y	T DM1 DM5	2(C-2), * 2(P-1), * (P-2) < Note 2 >	(+) See, Setting Condition in Fig. DM5.
⑧	7	TENSION BAND ASS'Y	T DM1 DM8	* (P-3), * (L-2), (R-1)	(+) See, Position Adjustment of Tension Post.
⑨	2	P5 SECTOR GEAR	T DM1 DM7	* (L-3) < Note 2 >	See, Alignment Procedures for Mechanism Item 13-7.
⑩	9	P5 ARM UNIT	T DM1 DM7	(N-1), (W-1), * (P-4)	(+) STOP < Note 3 > See, Height Adjustment of P5 Arm Unit.
⑪	11	TAKEUP REEL TABLE	T DM1	(R-2)	(+) < Note 5 > See, Height Adjustment of Reel Tables.
⑫	8	SUPPLY REEL TABLE	T DM1	(R-3)	
⑬	13	CAM FOLLOWER ARM UNIT	B DM2	(R-4)	< Note 4 >
⑭	13	MAIN/SUB LEVER ASS'Y	B DM2 DM8	2(C-2) < Note 2 >	See, Setting Condition in Fig. DM8.
⑮	14	CENTER PULLEY ASS'Y	B DM2 DM9	(C-3), Capstan Belt < Note 2 >	(+) See, Fig. DM9.
⑯	15	CLUTCH DISK ASS'Y	B DM2 DM10	(C-4) < Note 2 >	See, Alignment Procedures for Mechanism Item 13-4.
⑰	17	SPAN LIMITER	B DM2 DM10	(S-2), 3(R-5), (W-2) Capstan Belt	.....
⑱	17	SUN GEAR	B DM2 DM10	(W-3)	(+) See, Alignment Procedures for Mechanism Item 13-4.
⑲	18,13	MAIN CAM GEAR	B DM2 DM10	.....	(+) See, Alignment Procedures for Mechanism Items 13-2 and 13-3.
⑳	19	DETENT ARM	B DM10	.....	(+) .....
㉑	20	SUB CAM GEAR	B DM4 DM10	.....	(+) See, Alignment Procedures for Mechanism Item 13-1.
㉒	17	RETAINER GEAR ASS'Y	B DM10	.....	(+) See, Alignment Procedures for Mechanism Item 13-3.
㉓	17	SECTOR GEAR UNIT	B DM2 DM10	.....	(+) See, Alignment Procedures for Mechanism Item 13-5. < Note 6 >

STEP /LOC. No.	START -ING No.	PART	REMOVAL		INSTALLATION
			Fig. No.	REMOVE * UNHOOK /UNLOCK/RELEASE /UNPLUG /UNSOLDER	ADJUSTMENT #CONDITION
24	23,18	LOADING CAM GEAR	B	DM10	----- (+) See, Alignment Procedures for Mechanism Item 13-3. < Note 6 >
25	24,22 21	RING GEAR	B	DM10	----- (+) See, Alignment Procedures for Mechanism Item 13-1.
26	21	RELEASE LEVER UNIT	B	DM12	(S-3) (+) See, Setting Condition in Fig. DM12.
27	26	INTERMEDIATE GEAR	B	DM13	* (L-4), (W-4) < Note 2 > -----
28	27	DRIVE DISK	B	DM13	----- -----
29	29	LOADING ARM - S UNIT	B	DM2 DM10	* (L-5) (+) See, Alignment Procedures for Mechanism Item 13-5.
30	23,15	LOADING ARM - T UNIT	B	DM2 DM10	* (L-6) (
31	15	SUPPLY REEL GEAR UNIT	B	DM9	* (C-5) < Note 2 > (+) -----
32	15	TAKEUP REEL GEAR UNIT	B	DM9	* (C-6) < Note 2 > (+) -----
33	15	STOPPER BASE ASSY	B	DM11	(S-4) -----
34	33	PLAY ARM UNIT	B	DM13	----- -----
35	34,25	PLAY SET ARM	B	DM13	* (L-7) -----
36	12	TENSION ARM BASE UNIT	T B	DM1 DM2	(S-5), * (L-8) (+) See, Measurement and Adjustment of Back Tension.
37	3	CAPSTAN HOLDER ASSY	T	DM1	3(S-6) (+) See, Replacement of Capstan Rotor or Stator Unit.
38	38	MODE SELECT SWITCH ASSY	T	DM1	(S-7) * Connections See, Alignment Procedures for Mechanism Item 13-8.
39	39	A/C HEAD UNIT	T	DM1 DM3	(N-2),(W-3), * (P-5) (+) See, Confirmation of A/C Head Height.
40	39	CHASSIS P.C.B.	T	DM1 DM14	2(S-8), * P1553 * Connections -----
41	41	SOLENOID UNIT	T	DM1 DM15	(S-9), * (P-6) * Connections -----
42	41	SOLENOID LEVER UNIT	T	DM15	* (L-9) (+) -----
43	42	V STOPPER (L,R)	T	DM1	4(S-10) -----
44	29,42	LOADING POST BASE - S UNIT	T	DM1	Slide to rear to remove (+) -----
45	30,42	LOADING POST BASE - T UNIT	T	DM1	Slide to rear to remove
46	46	D.D CYLINDER UNIT	B	DM2	3(S-11) See, Replacement of D.D. Cylinder Unit.
47	47	SUB LOADING ARM UNIT	T	DM16	* (P-7), * (L-10) -----

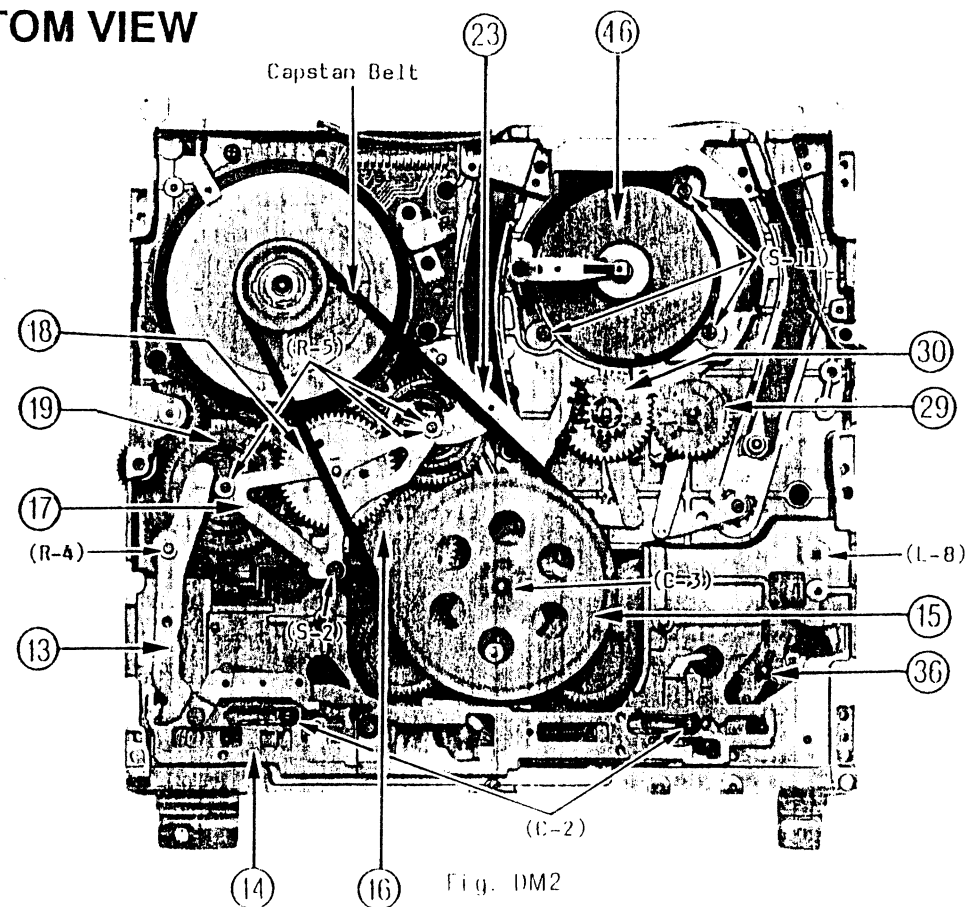
List of Abbreviations:

T= Top; B= Bottom
(R-1)=Retaining Ring (R-1); 2(P-1)=2 Springs (P-1); (S-1)=Screw (S-1);
(W-1)=Washer (W-1); 3(S-5)=3 Screws (S-5); (C-1)=Cut Washer(C-1);
(N-1)=Nut (N-1); (L-1)=Locking Tab (L-1)
(+): Refer to Exploded Views for Lubrication information.

TOP VIEW



BOTTOM VIEW



A/C Head Spring Hooking Position

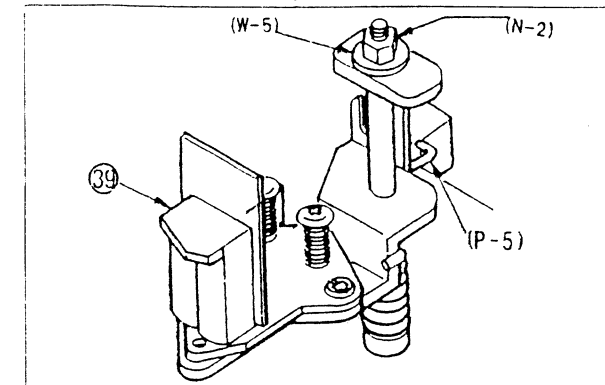


Fig. DM3

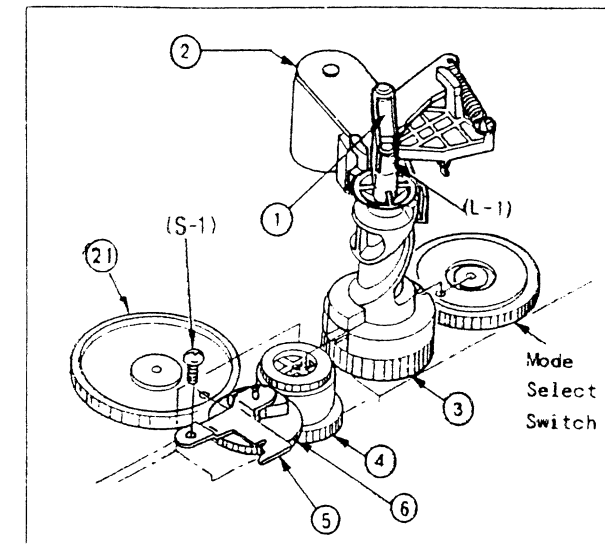


Fig. DM4

Main Brake Springs Hooking Position

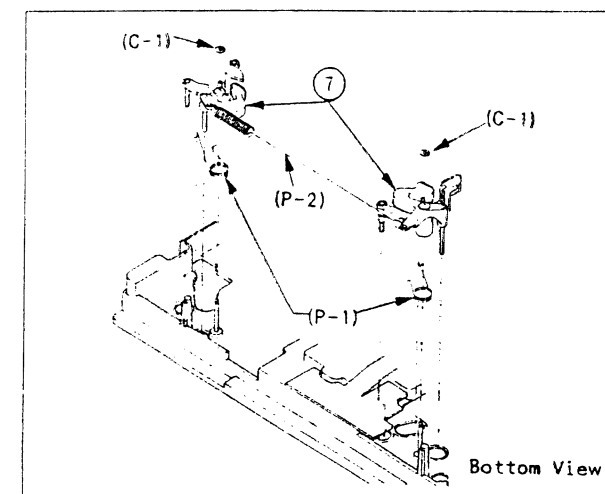


Fig. DM5

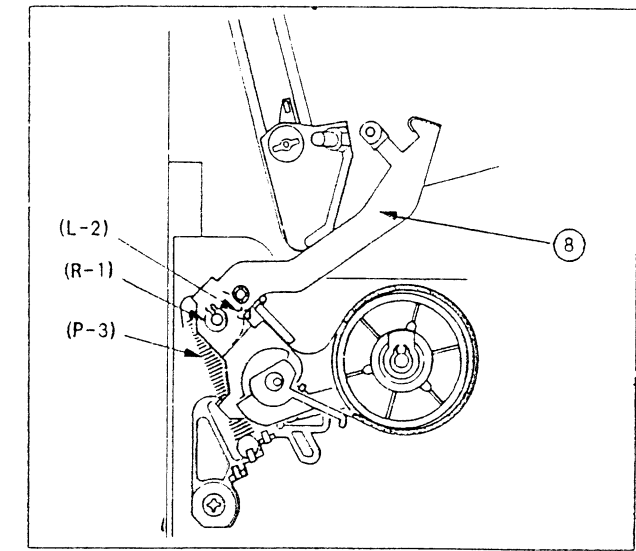


Fig. DM6

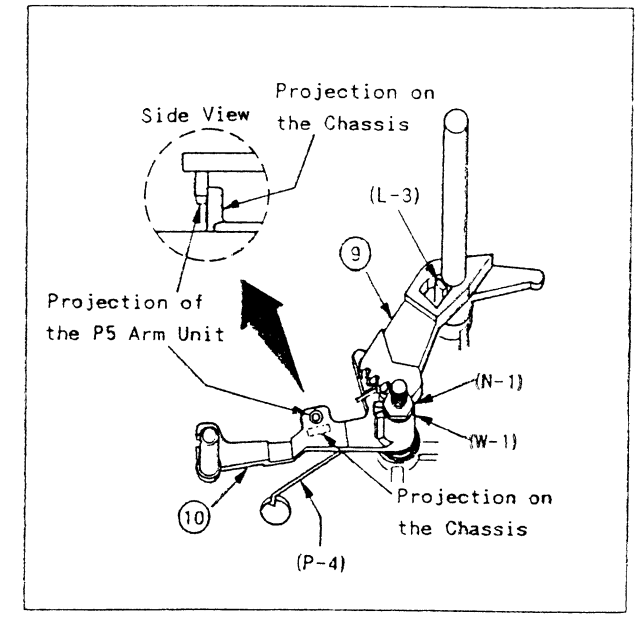


Fig. DM7

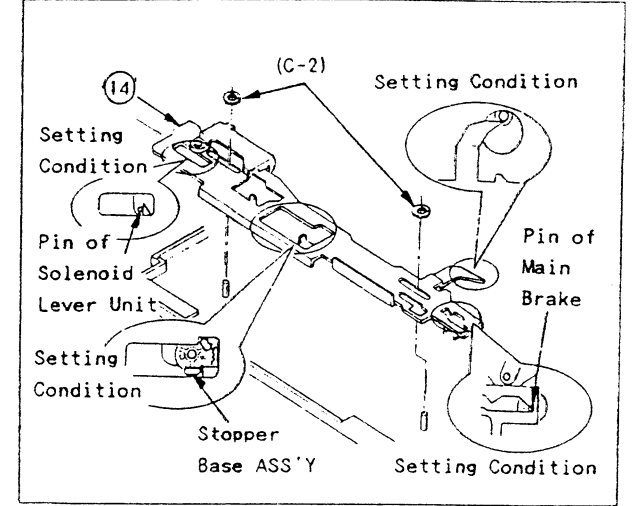


Fig. DM8

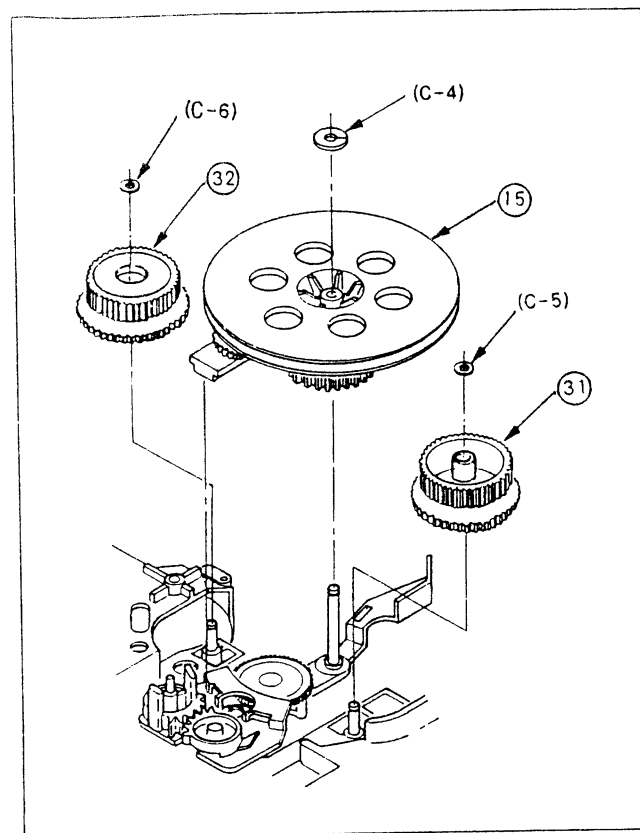


Fig. DM9

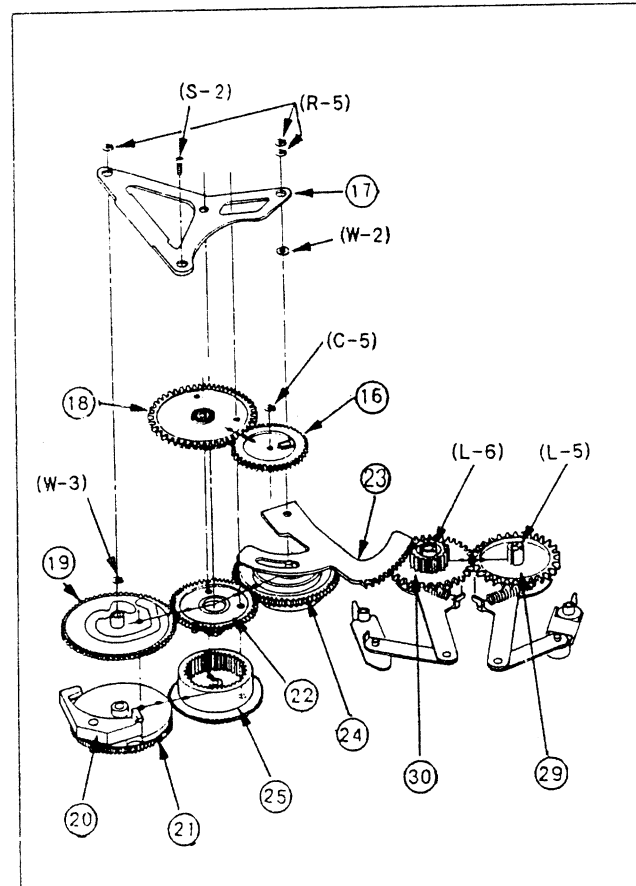


Fig. DM10

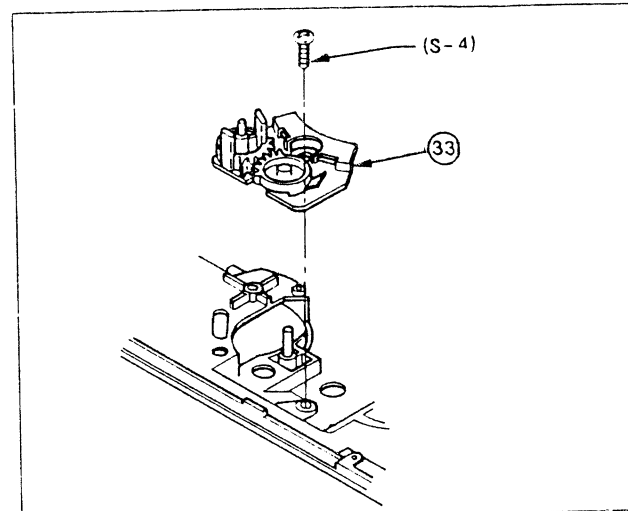


Fig. DM11

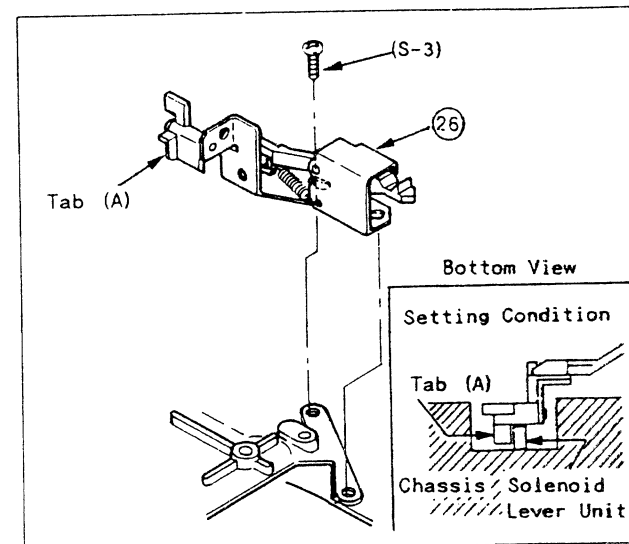


Fig. DM12

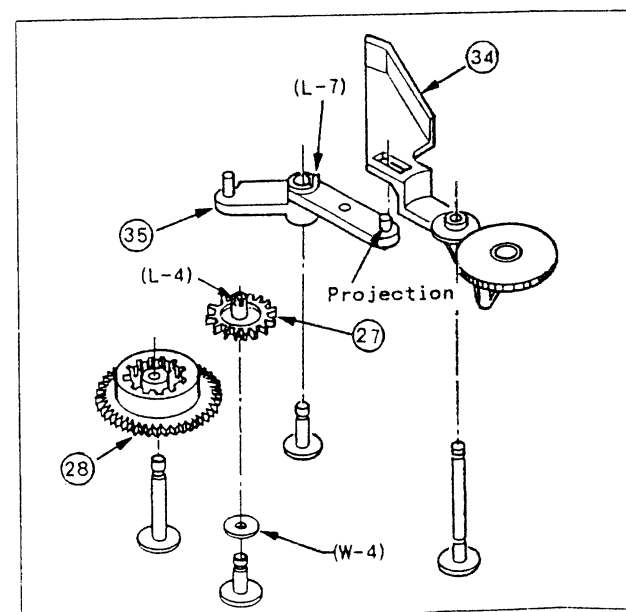


Fig. DM13

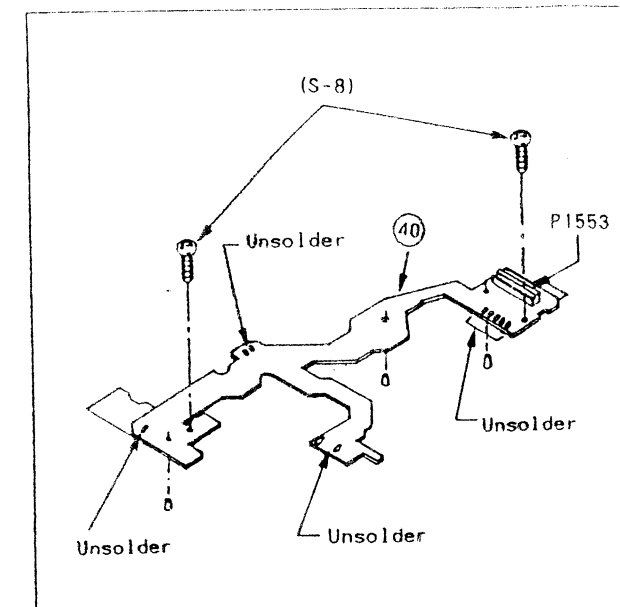


Fig. DM14

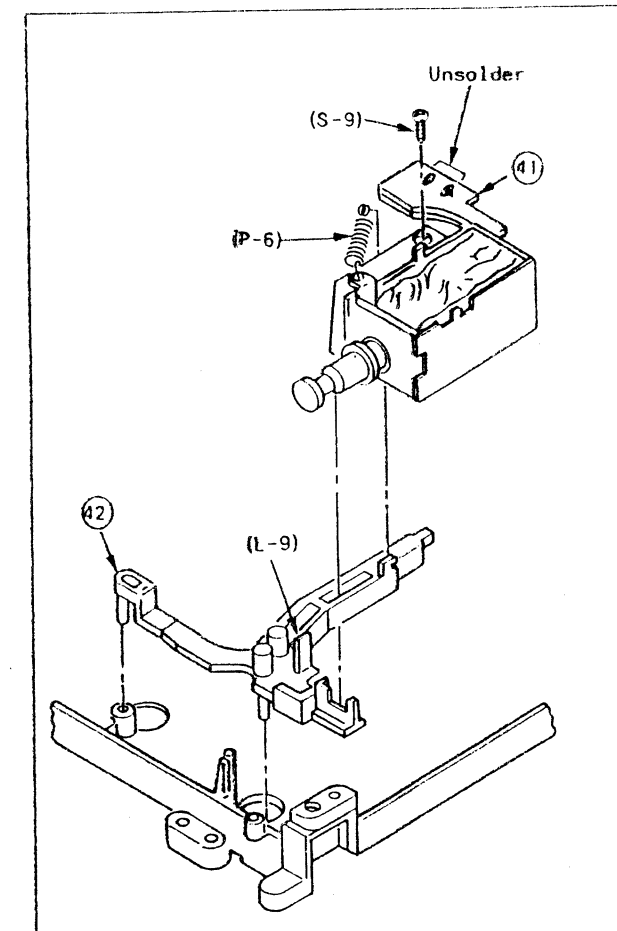


Fig. DM15

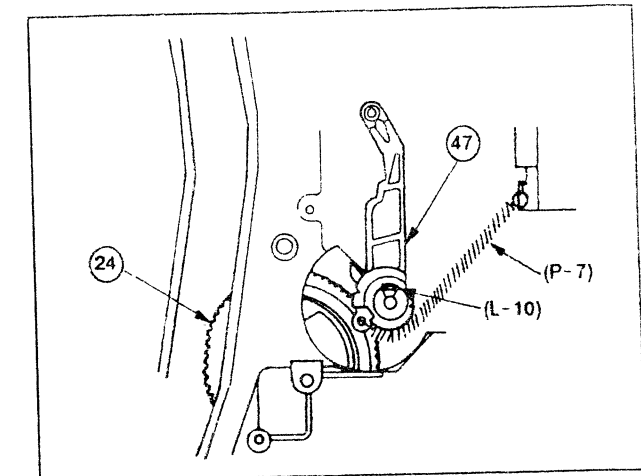


Fig. DM16

Reference <Notes> in Table 12 :

1. Wiggle it sideways to properly seat the Pressure Roller Arm Unit.
2. This cut washer is not reusable. If removed, install a new one.
3. Install the P5 Arm Unit so that the projection of the P5 Arm Unit is positioned in back of the projection on the chassis, as shown in Fig. DM7.
4. Install the Cam Follower Arm Unit so that the pin on the Cam Follower Arm Unit meets the inner slot of the Main Cam Gear.
5. When reinstalling the Supply and Takeup Reel Tables, clean the rotating surface of them with a soft cloth.
6. Ensure the Tape Tension Arm is positioned as shown in Fig. DM1 for STOP Mode.

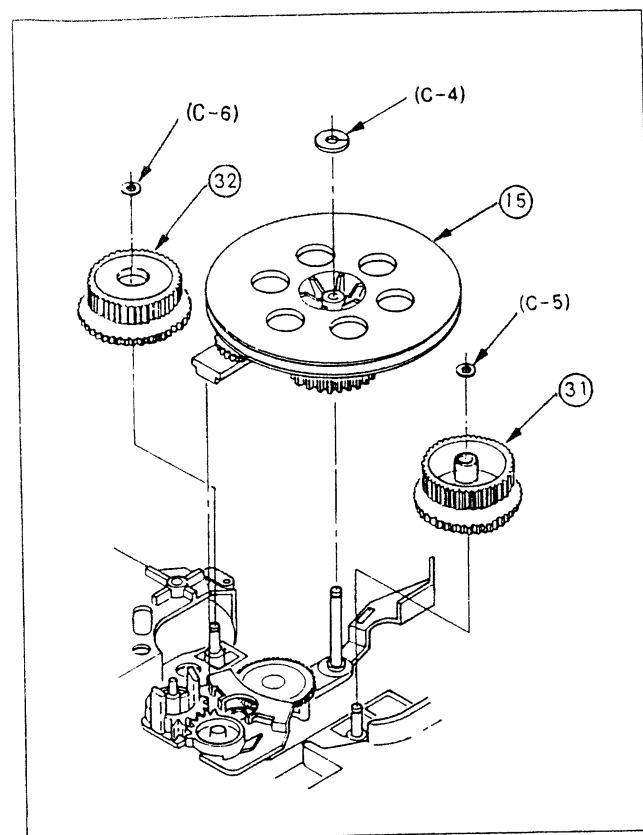


Fig. DM9

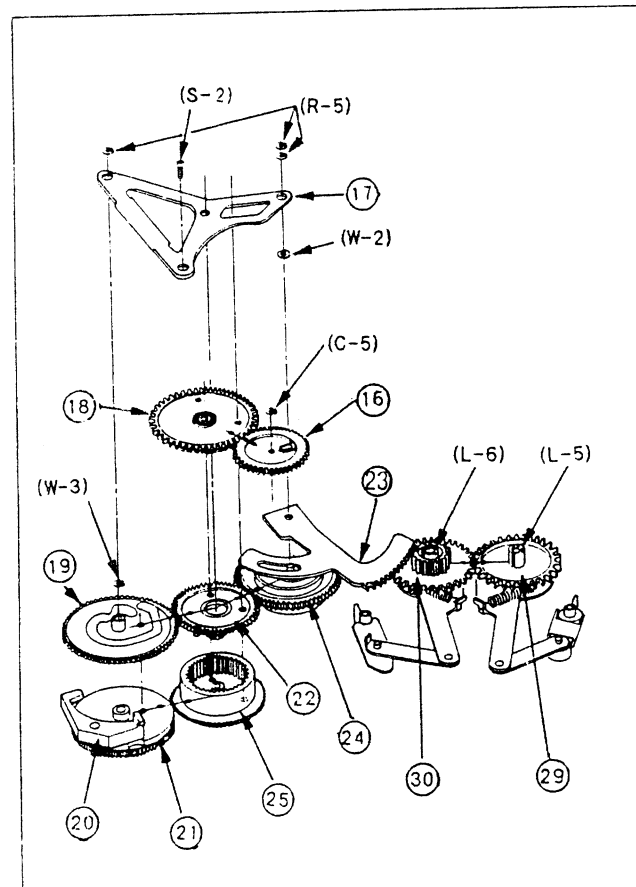


Fig. DM10

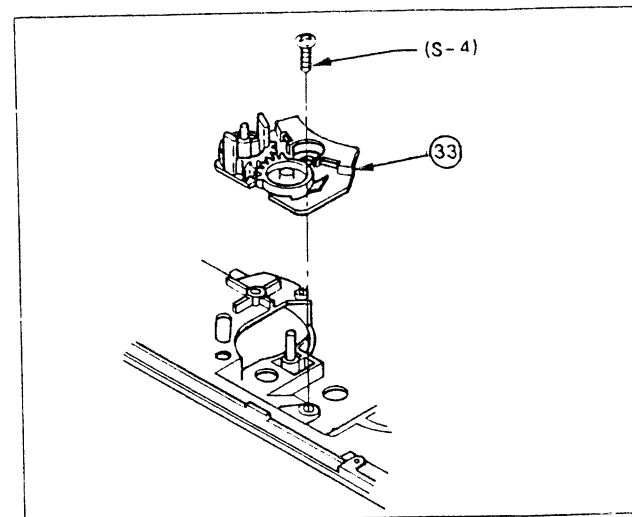


Fig. DM11

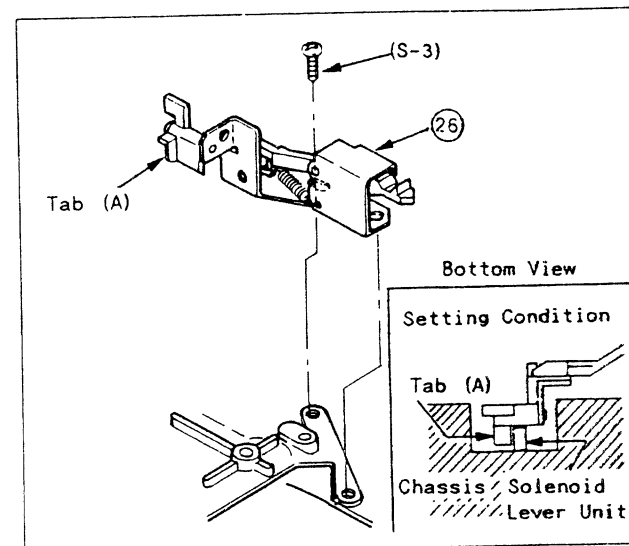


Fig. DM12

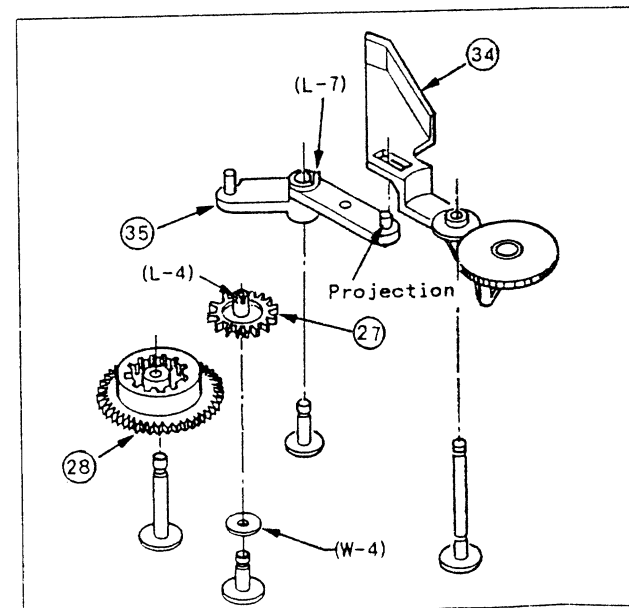


Fig. DM13

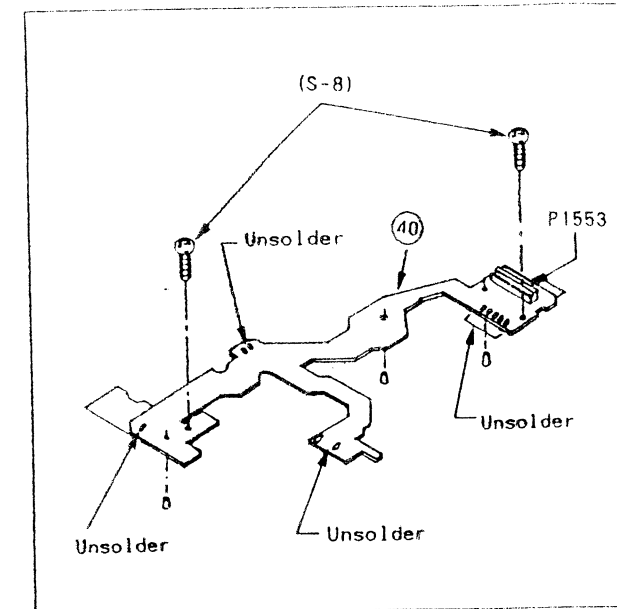


Fig. DM14

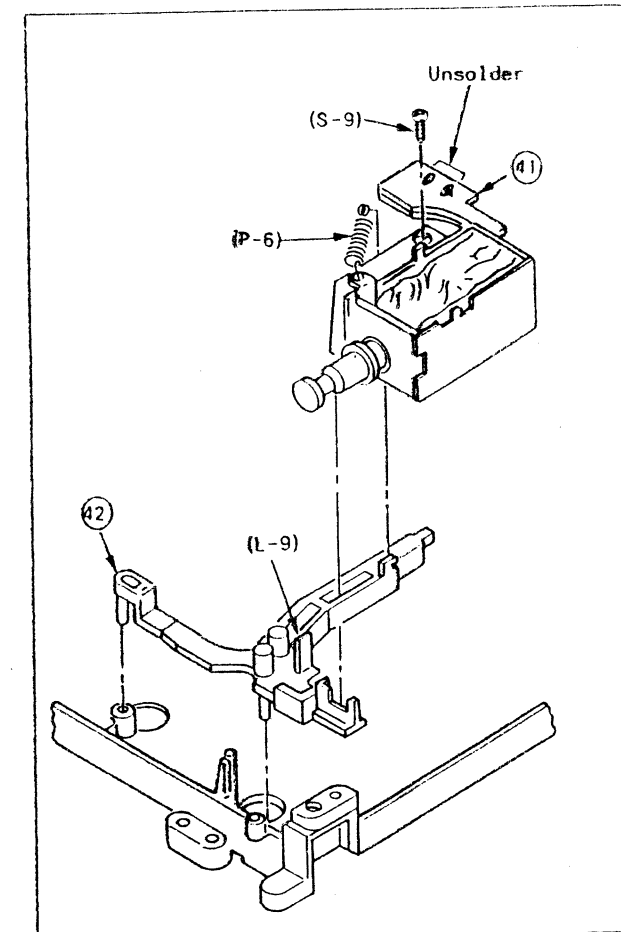


Fig. DM15

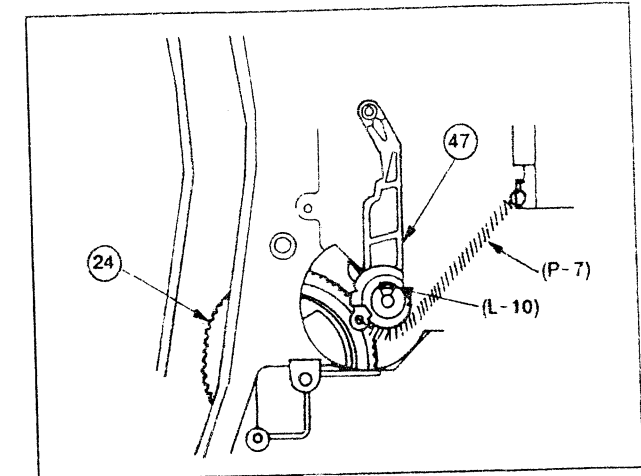


Fig. DM16

Reference <Notes> in Table 12 :

1. Wiggle it sideways to properly seat the Pressure Roller Arm Unit.
2. This cut washer is not reusable. If removed, install a new one.
3. Install the P5 Arm Unit so that the projection of the P5 Arm Unit is positioned in back of the projection on the chassis, as shown in Fig. DM7.
4. Install the Cam Follower Arm Unit so that the pin on the Cam Follower Arm Unit meets the inner slot of the Main Cam Gear.
5. When reinstalling the Supply and Takeup Reel Tables, clean the rotating surface of them with a soft cloth.
6. Ensure the Tape Tension Arm is positioned as shown in Fig. DM1 for STOP Mode.

13. ALIGNMENT PROCEDURES OF MECHANISM

The mechanism of this model is mostly engaged to the System Control Circuit, through the mode select switch. Therefore the relation between the mode select switch and the cam gear decides all further mechanical movement of the mechanical parts such as levers, gears, rollers and so on. For specific removal and installation procedures, refer to the Disassembly/Assembly Procedures on page 15.

If these parts are not properly aligned and only off by one tooth, the unit will be unloaded or stopped. It may result in damage to the mechanical or electrical parts. The overall mechanical condition of the bottom and top views are shown in Fig. A1 and Fig. A2. This mechanical adjustment is performed in the Half Load Stop (FF/REW) Mode. The detail of mechanical condition will be described later.

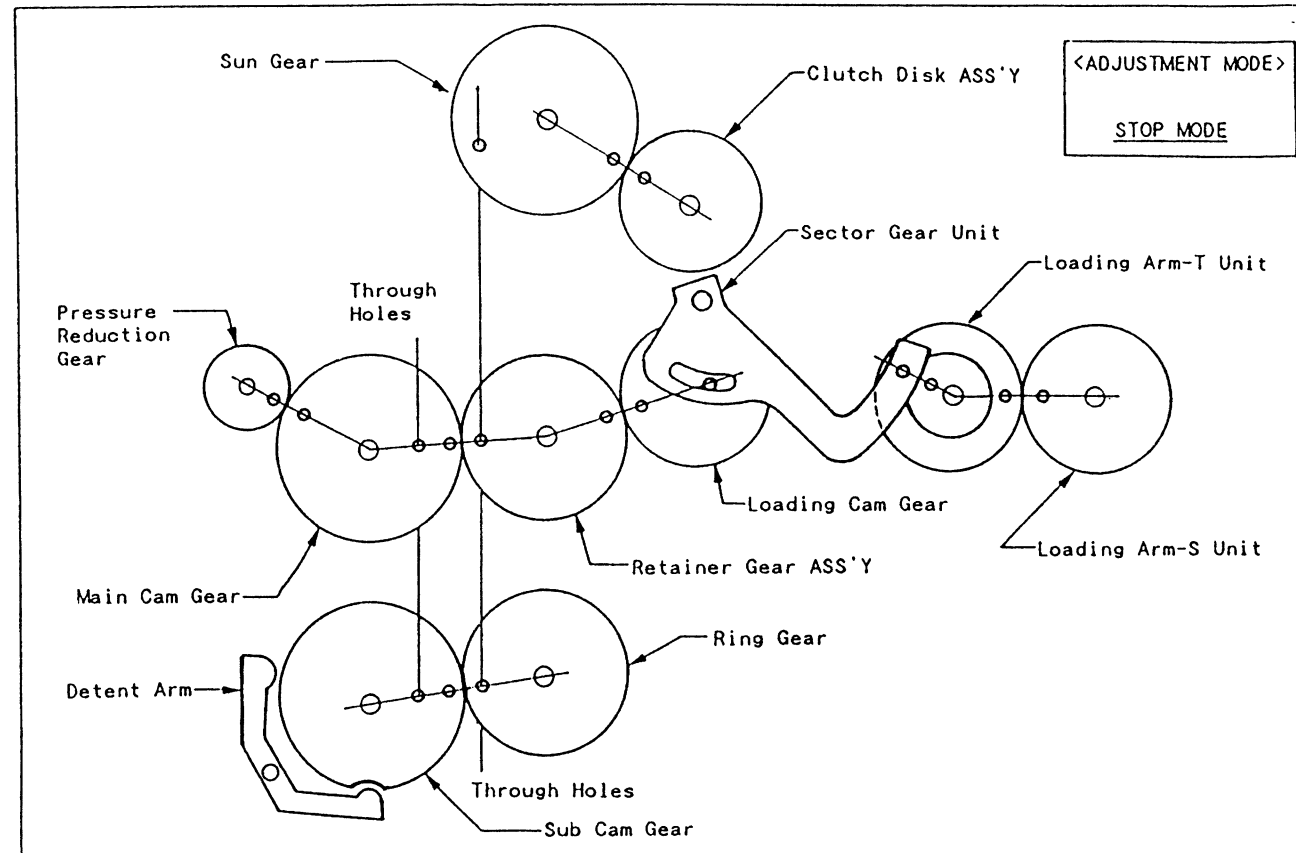


Fig. A1 Bottom View of Overall Mechanical Condition

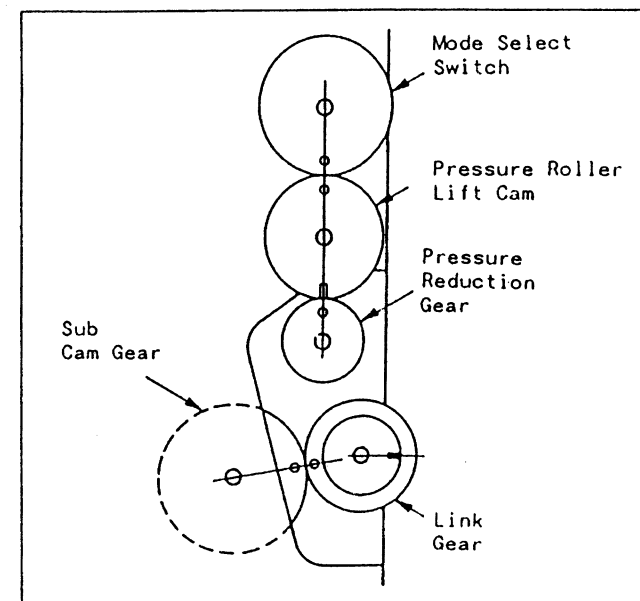


Fig. A2 Top View of Overall Mechanical Condition

Important Note :

All through hole alignments must be made precisely so that the complete procedure will exactly align the gear teeth. If the alignment is off by only one tooth then the mechanism will not operate properly.

13-1. ALIGNMENT PROCEDURES OF SUB CAM GEAR, RING GEAR AND DETENT ARM

1. Install the Ring Gear so that the holes on Ring Gear are exactly in line with the holes on chassis as shown Fig. A3.
2. Install the Sub Cam Gear so that the hole on Sub Cam Gear is exactly in line with the hole on chassis, at the same time, the small hole (located just outside of large hole) on Sub Cam Gear is exactly in line with the hole on Ring Gear.
3. Install the Detent Arm.

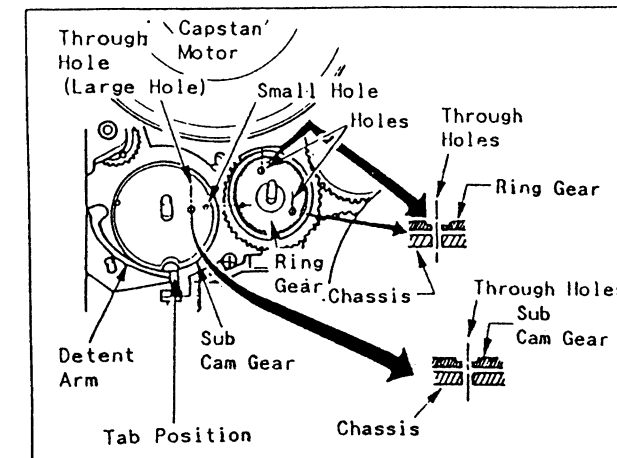


Fig. A3

13-2. ALIGNMENT PROCEDURES OF MAIN CAM GEAR AND PRESSURE REDUCTION GEAR

1. Install the Pressure Reduction Gear from top side of chassis.
2. Install the Main Cam Gear onto the Sub Cam Gear so that the small hole on Main Cam Gear is exactly in line with the small hole on Pressure Reduction Gear. And the large hole on Main Cam Gear is in line with the large hole on Sub Cam Gear as shown in Fig. A4.

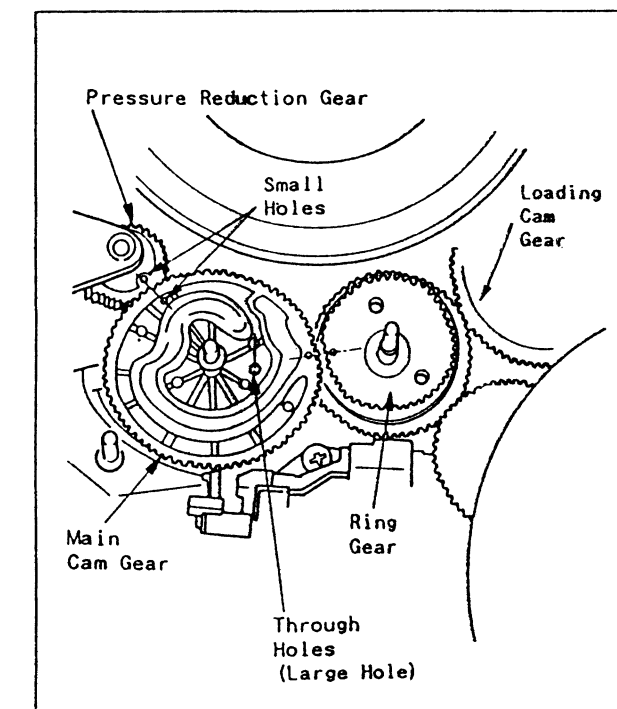


Fig. A4

13-3. ALIGNMENT PROCEDURES OF MAIN CAM GEAR, RETAINER GEAR ASS'Y AND LOADING CAM GEAR

1. Install the Retainer Gear ASS'Y so that the Holes on the Retainer Gear ASS'Y aligns with Holes on the Ring Gear and Holes on the Chassis. To facilitate aligning the three holes use a small hex. wrench or a metal pin.
2. Install the Loading Cam Gear so that the Hole on the Loading Cam Gear aligns with the Hole on the Retainer Gear ASS'Y.
3. Confirm that the Hole on the Main Cam Gear aligns with the Hole on the Retainer Gear ASS'Y.

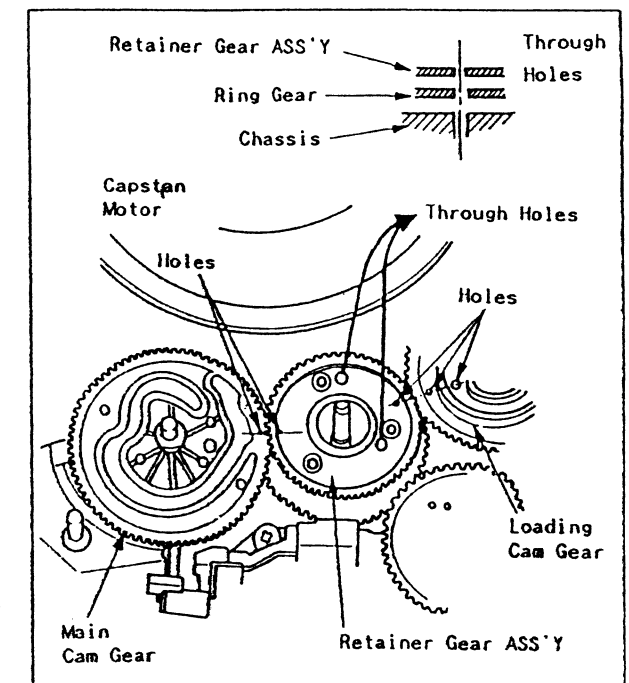


Fig. A5

13-4. ALIGNMENT PROCEDURES OF SUN GEAR AND CLUTCH DISK ASS'Y

1. Install the Sun Gear so that the Holes on the Sun Gear aligns with the through Holes on the Retainer Gear ASS'Y, Ring Gear and chassis. To facilitate aligning the four holes use a small hex. wrench or a metal pin.
2. Install the Clutch Disk ASS'Y so that the small Hole on the Clutch Disk ASS'Y aligns with Hole on the Sun Gear.

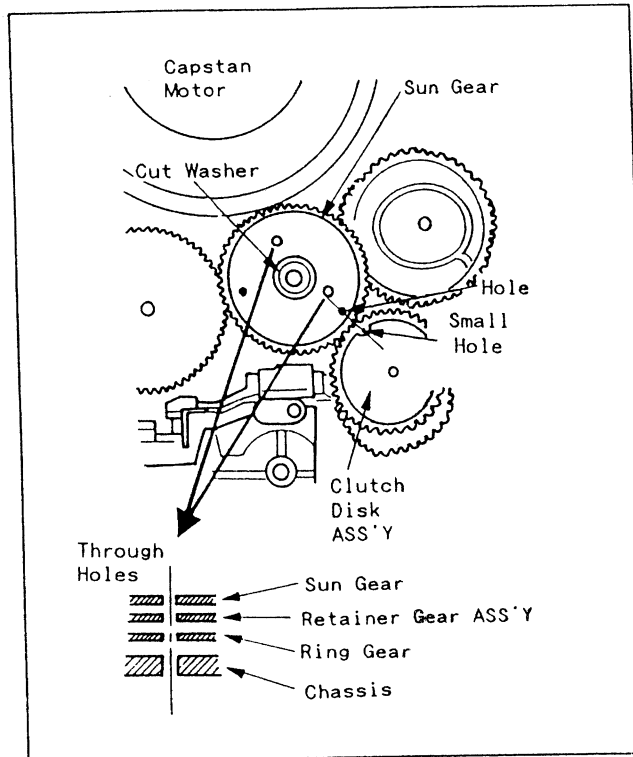


Fig. A6

13-5. ALIGNMENT PROCEDURES OF LOADING ARM-T UNIT, LOADING ARM-S UNIT AND SECTOR GEAR UNIT

1. Set the P2 and P3 posts to unloading position, then install the Loading Arm-T Unit and S Unit so that the hole on Loading Arm-T Unit is exactly in line with the hole on Loading Arm-S Unit.
2. Install the Sector Gear Unit so that the hole on Sector Gear Unit is exactly in line with the projection mark on Loading Arm-T Unit.
3. Install the Span Limiter using Retaining Rings and Screw, Fig. A7.

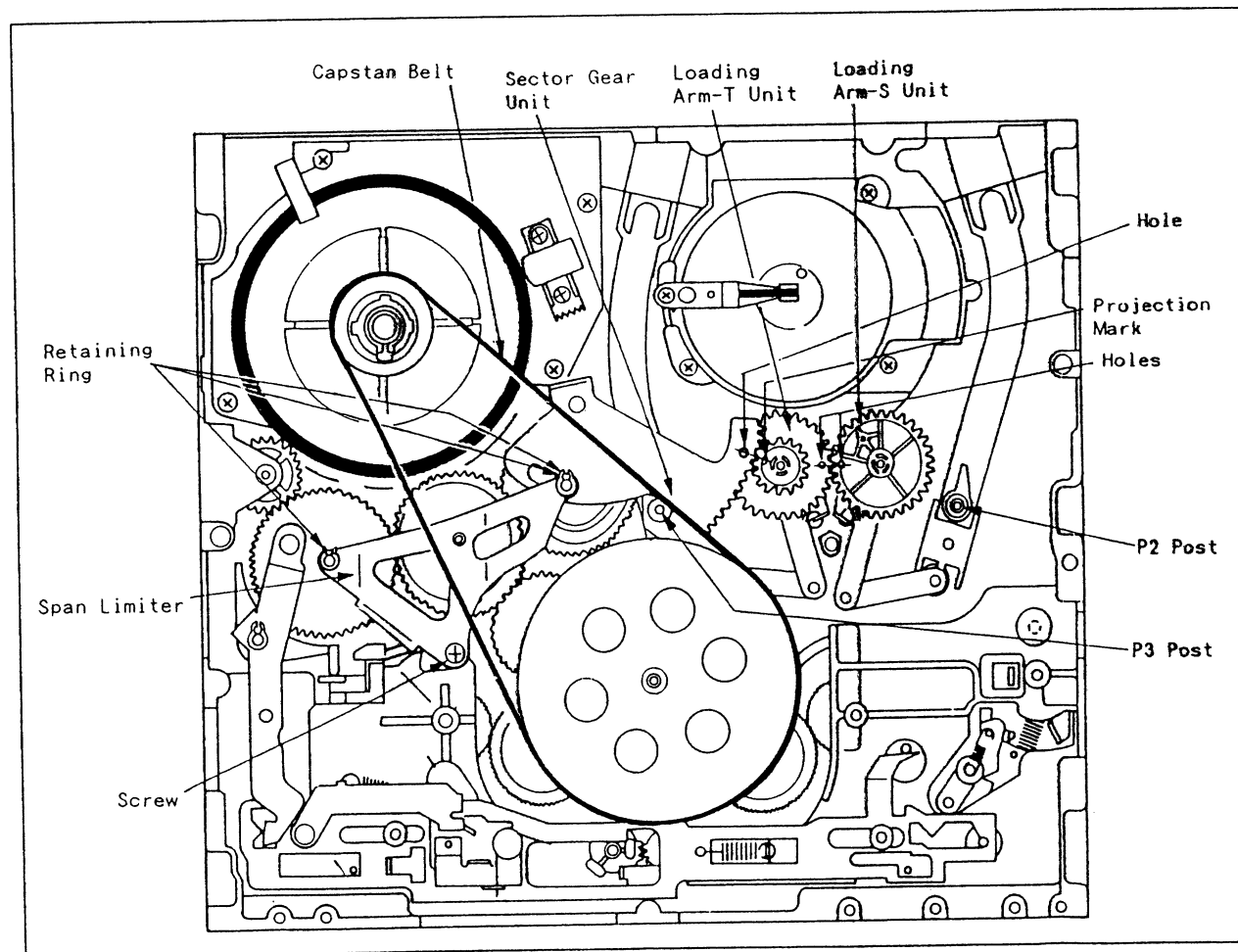


Fig. A7

13-6. ALIGNMENT PROCEDURES OF LINK GEAR

Note:

Before this alignment, Sub Cam Gear position (and positions of all bottom side gears) must be in their correct alignment position for Half Load Stop (FF/REW) Mode as previously described. Push down to seat the Sector Gear Unit, refer to 13-5. Install the Link Gear so that the Line on the Link Gear is parallel to the side line of Mechanical Chassis, as shown in Fig. A8.

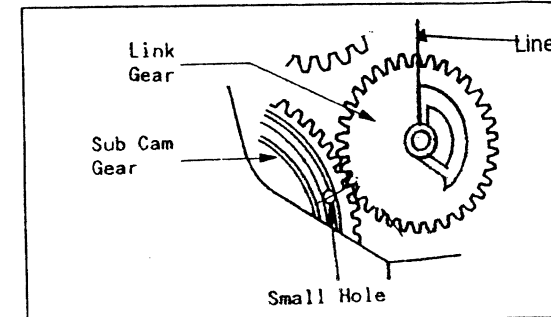


Fig. A8

13-7. ALIGNMENT PROCEDURES OF P5 SECTOR GEAR AND P5 ARM UNIT

1. Install the P5 Sector Gear so that the hole of P5 Sector Gear aligns with the last tooth on the P5 Arm Unit, refer to Fig. A9.

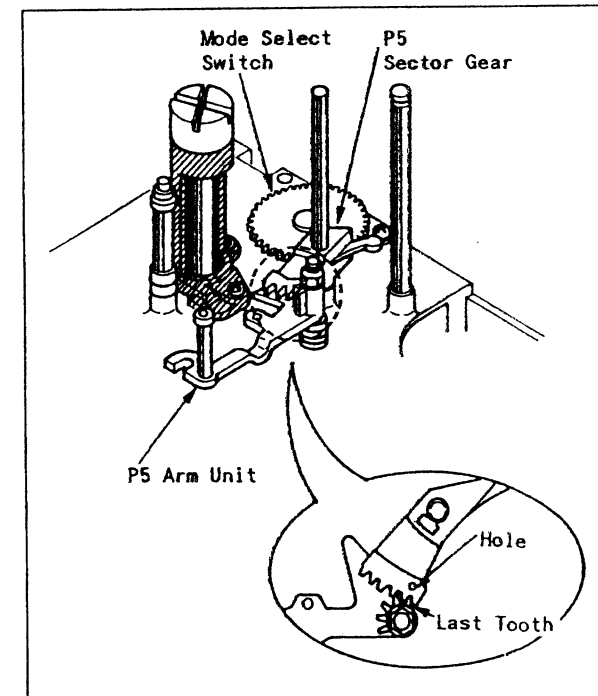


Fig. A9

13-8. ALIGNMENT PROCEDURES OF PRESSURE ROLLER LIFT CAM, MODE SELECT SWITCH AND PRESSURE REDUCTION GEAR

1. Push P5 Arm Unit clockwise until it stops and hold it in this position. Then install the Pressure Roller Lift Cam so that Hole on the Mode Select Switch aligns with Hole on the Pressure Roller Lift Cam and Projection on Pressure Roller Lift Cam aligns with Small Indentation on Pressure Reduction Gear when pushing the P5 Arm Unit completely as indicated by the arrow.

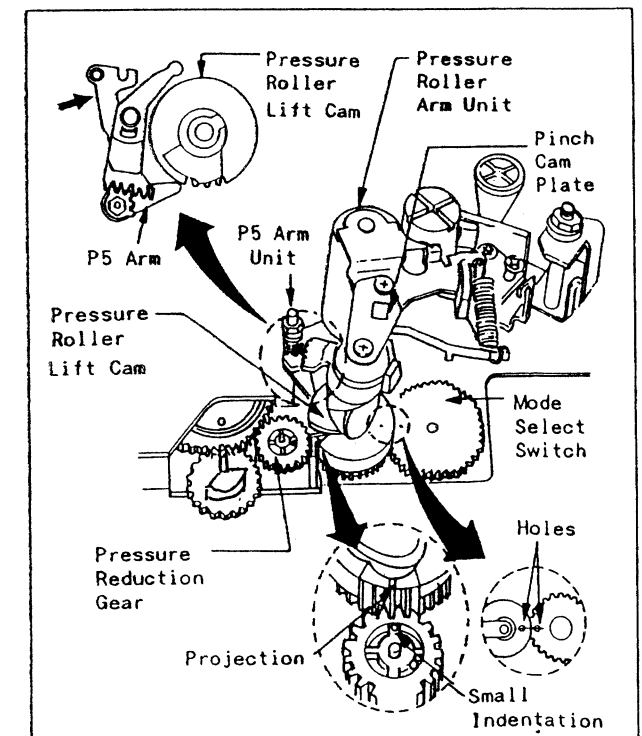


Fig. A10

14. DISASSEMBLY/ASSEMBLY AND ADJUSTMENT OF CASSETTE UP UNIT

STEP /LOC. No.	START - ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE * UNHOOK/UNLOCK /RELEASE	ADJUSTMENT # CONDITION
①	1	SUB FRAME UNIT	R	DM1	2(S - 1)	(+) See, Adjustment of Cassette Up Unit Item 15.
②	1	INTERMEDIATE GEAR	R	DM1	.....	
③	1	WIPER ARM	R	DM1	.....	
④	1	GEAR PULLEY	R	DM1	(C - 1), Loading Belt	
⑤	5	LOADING MOTOR UNIT	R	DM1	2(S - 2)	.....
⑥	6	PANEL OPENER	R	DM1	(C - 2)	.....
⑦	7	ANGLE	T	DM2	2(S - 3)	.....
⑧	8	SIDE FRAME R UNIT	T	DM2	2(S - 4)	.....
⑨	8	SUB HOLDER ASS'Y	T	DM2	.....	See, Adjustment of Cassette Up Unit Item 15.
⑩	8	FRONT FRAME UNIT	T	DM2	(S - 5), (C - 3)	.....
⑪	11	SIDE FRAME L UNIT	T	DM2	(S - 6)	.....

List of Abbreviations:

R = Right, L = Left ; 3 (L-1) = 3 Locking Clips (L-1)

(+): Refer to Exploded Views for Lubrication information.

(Right Side)

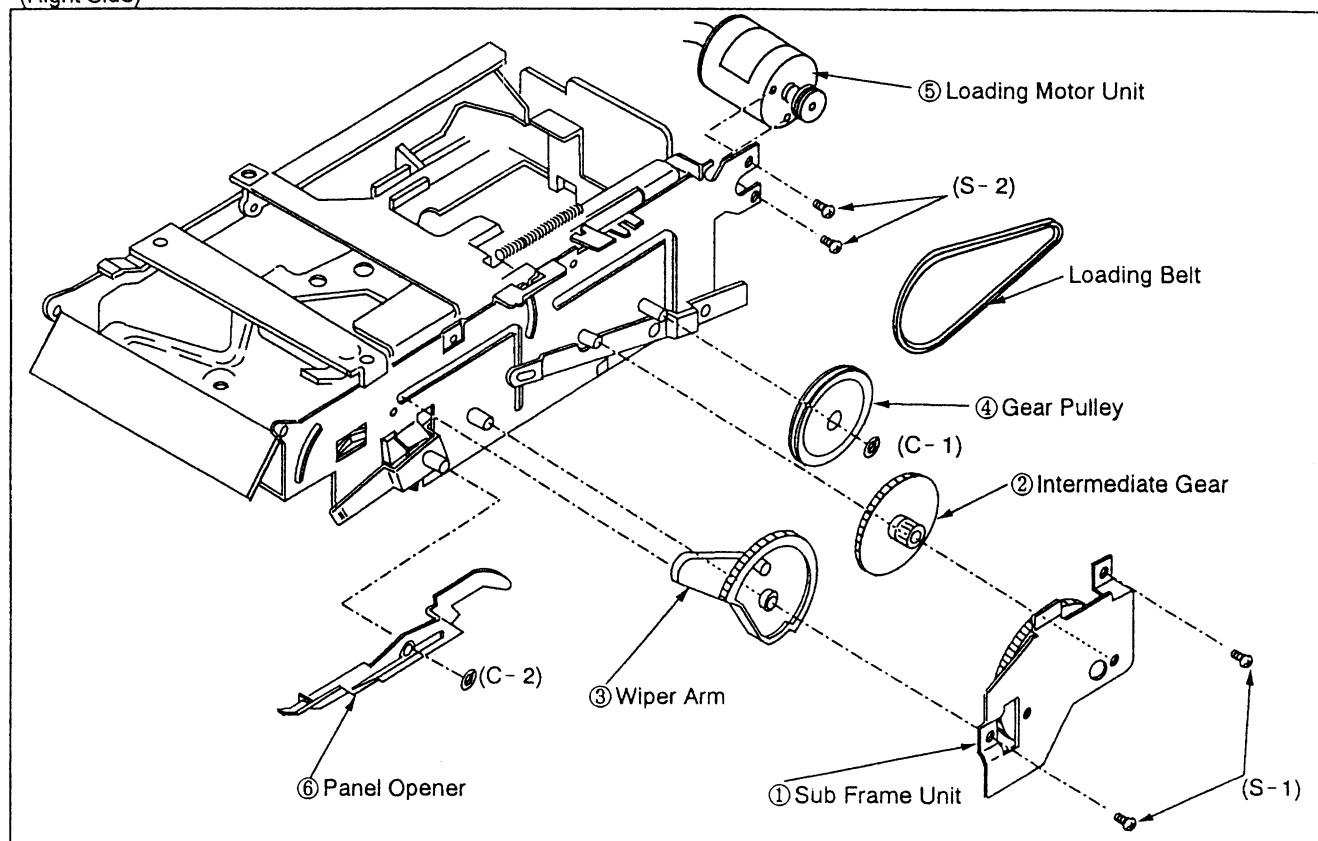


Fig. DA1

(Top Side)

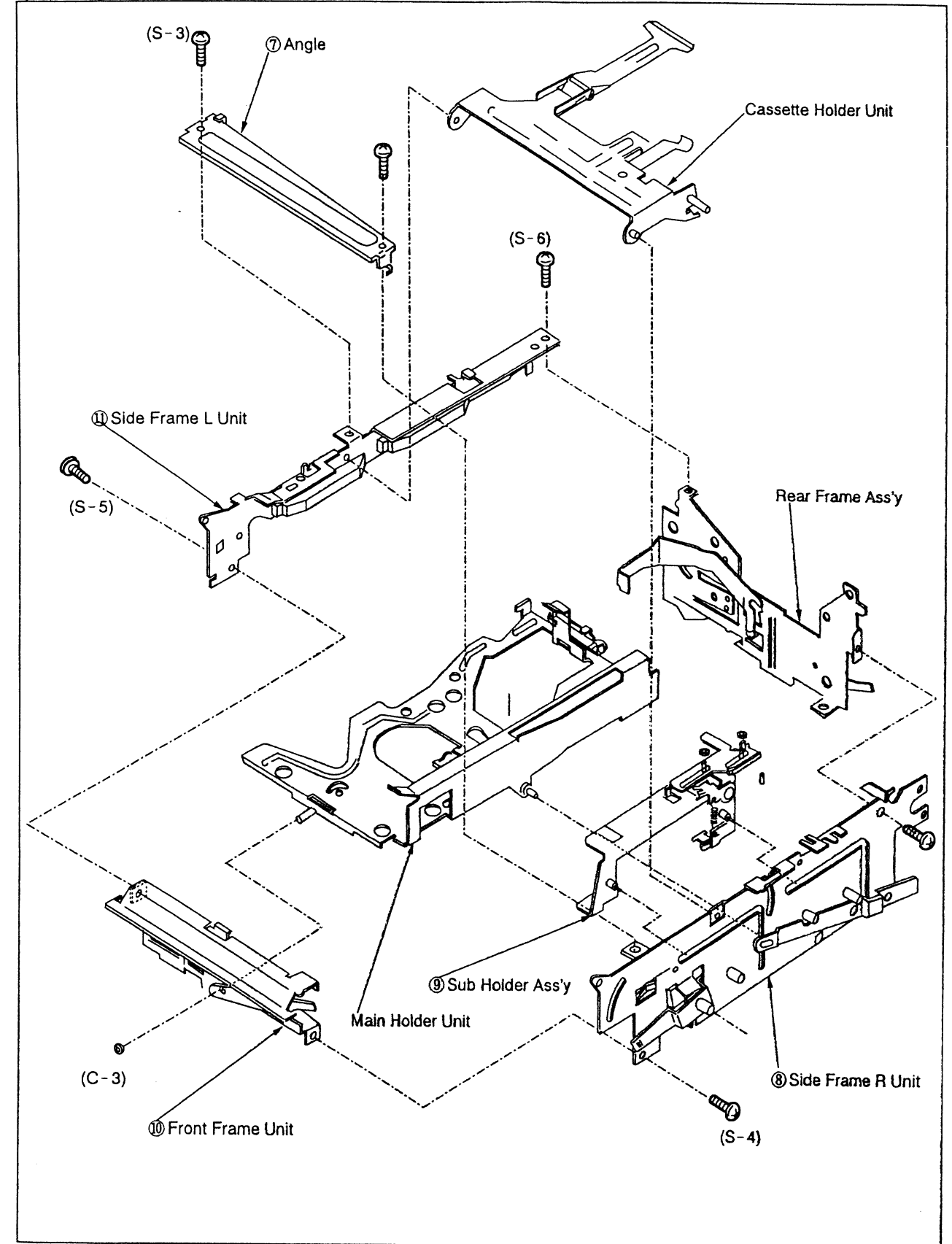


Fig. DA2

4.4 ELECTRICAL ADJUSTMENT PROCEDURES

1. TEST EQUIPMENT

To perform the electrical adjustments completely, the following equipment is required.

1. Dual-trace oscilloscope
Voltage range : 0.001~50V/Div.
Frequency range : DC~50MHz
Probes : 10:1, 1:1
2. Color TV receiver or monitor
3. DC voltmeter
4. Plastic tip driver and non-metal driver
5. Adjustable power supply unit
6. PAL VHS alignment tape (4822 397 30103)

Caution:
Because a Hot Chassis Ground is present in the Power Supply Circuit, a separated adjustable power supply unit must be used.

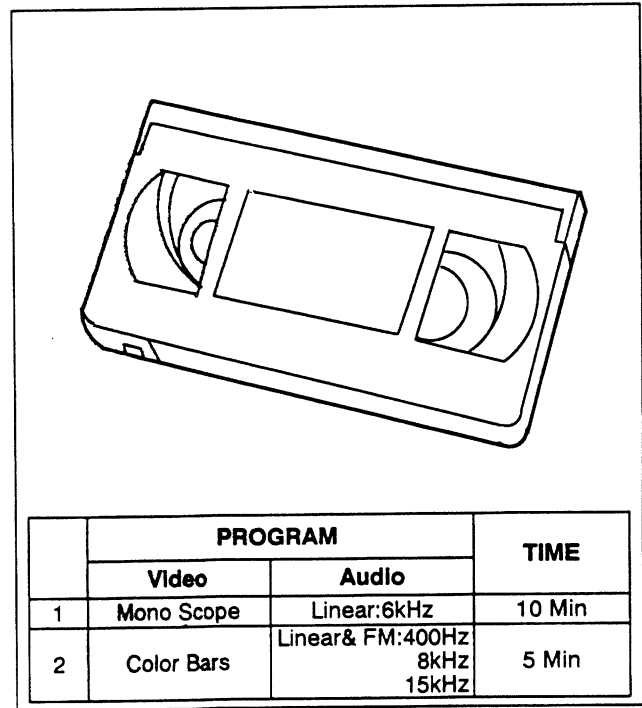


Fig. E1

2. HOW TO READ THE ADJUSTMENT PROCEDURES

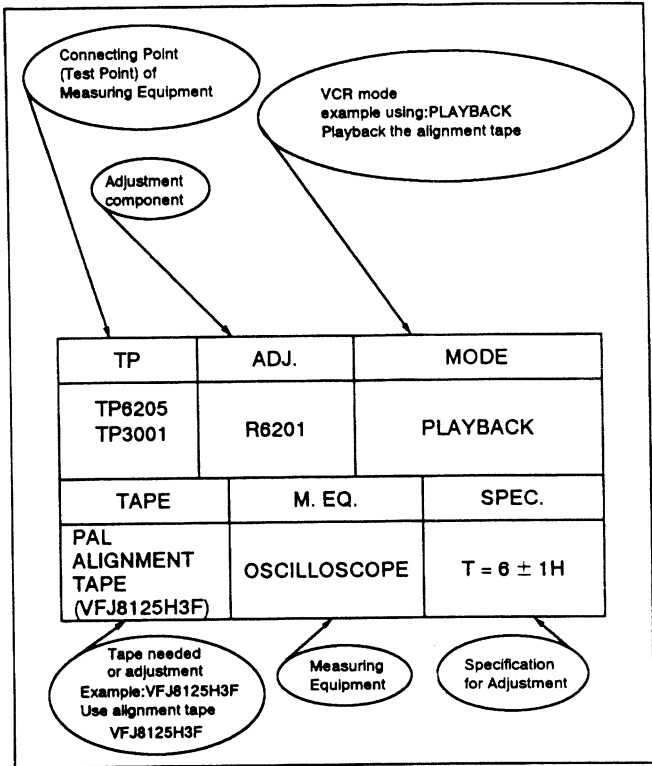


Fig. E2

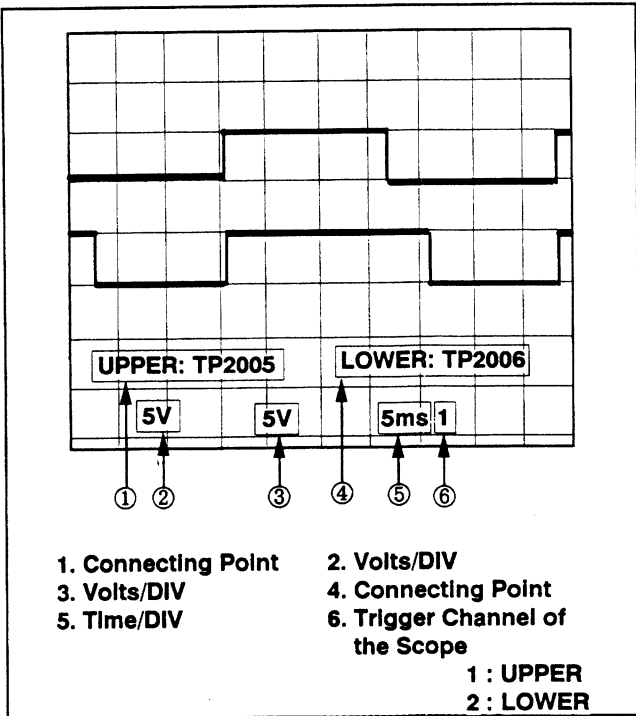


Fig. E3

3. ADJUSTMENT PROCEDURES

These adjustment procedures consist of the following sections.

1. Servo Section
2. Audio Section
3. Luminance and Chrominance Section

3-1. SERVO SECTION

3-1-1. HEAD SWITCHING POSITION ADJUSTMENT (PG SHIFTER)

Purpose:
Determine the Head Switching Point during Playback.

Symptom of Misadjustment:
May cause Head Switching Noise and/or Vertical Jitter in the picture.

TP	ADJ.	MODE
TP3001 TP6205	R6201	PLAYBACK
TAPE	M. EQ.	SPEC.
PAL ALIGNMENT TAPE	OSCILLOSCOPE	T=6 ± 1H (0.38 ± 0.06msec) Refer to Fig. E4

Note:
TP3001 : Video Signal Process Section on the Main C.B.A.
TP6205, R6201 : Servo Section on the Main C.B.A.

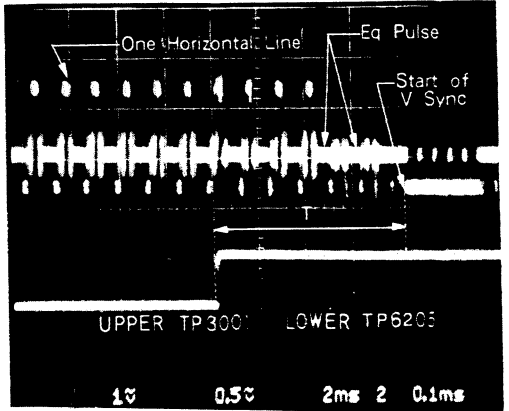


Fig. E4

3-2. AUDIO SECTION

3-2-1. Hi-Fi AUDIO SECTION

3-2-1-1. AUDIO MUTING ADJUSTMENT

Purpose:
To eliminate the Hi-Fi Audio function when the FM Carrier level is inadequate.

Symptom of Misadjustment:
Significant noise will be heard in the Audio, or the Unit will not go into the Hi-Fi Audio mode.

(SETUP)
Eject the tape and reinsert it again, this will access the Neutral Tracking position.

TP	ADJ.	MODE
29 Pin of IC4205	R4209	PLAYBACK
TAPE	M. EQ.	SPEC.
PAL ALIGNMENT TAPE	OSCILLOSCOPE	

- Note :**
29 Pin of IC4205, R4209 : Audio Section on the Main C.B.A.
1. Insert a PAL ALIGNMENT Tape and playback the Hi-Fi recording portion.
 2. Adjust the Tracking Control on the unit so that the amplitude of the signal at Pin 29 of IC4205 is reduced to 1/3.
 3. First adjust AUDIO MUTING (R4209) until the Hi-Fi indication turns OFF.
 4. Then slowly adjust AUDIO MUTING (R4209) to the point where the Hi-Fi indication just turns ON.
 5. Confirm that the audio on CH-L and CH-R does not contain any abnormal sounds.

3-3. LUMINANCE CHROMINANCE SECTION

3-3-1. LOW FREQUENCY NOISE CANCELLER ADJUSTMENT (LINE NOISE CANCELLER)

Purpose:

Improve the overall S/N Ratio especially in the Low Frequency Component.

Symptom of Misadjustment:

The S/N Ratio will be lower.

TP	ADJ.	MODE
TP3003 (33 Pin of IC3002)	R3026	PLAYBACK
TAPE	M. EQ.	SPEC.
PAL ALIGNMENT TAPE	OSCILLOSCOPE	Refer to Fig. E5-1 and Fig. E5-2.

Note :

Use TP6205 as a Trigger, located on Servo Section on the Main C.B.A.

TP3003, R3026: Video Signal Process Section on the Main C.B.A.

Adjust the LINE NOISE CANCELLER (R3026) so that upper and lower envelope from the center line is to be symmetrical.

(Misadjustment)

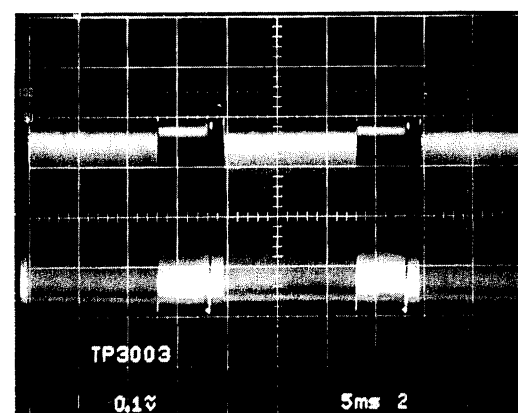


Fig. E5-1

(Correct Adjustment)

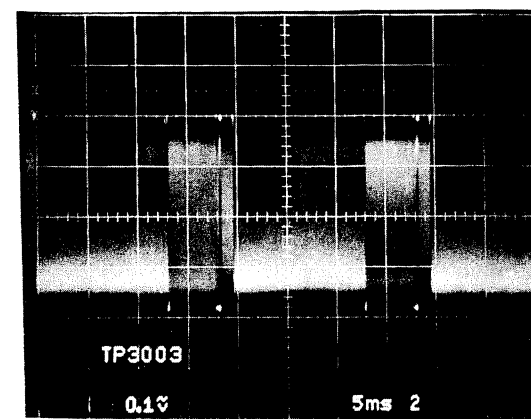


Fig. E5-2

3-3-2. PLAYBACK LEVEL ADJUSTMENT

Purpose :

To align the playback Level of the Video Signal with the Recording (E-E) Level.

Symptom of Misadjustment :

Playback interchangeability is inadequate.

TP	ADJ.	MODE
TP3001	R3039	PLAYBACK
TAPE	M. EQ.	SPEC.
PAL ALIGNMENT TAPE	OSCILLOSCOPE	A = $2.0 \pm 0.1V_{p-p}$

Note :

TP3001, R3039 : Video Signal Process Section on the Main C.B.A.

Adjust R3039 so that the A Level at TP3001 is $2.0 \pm 0.1V_{p-p}$.

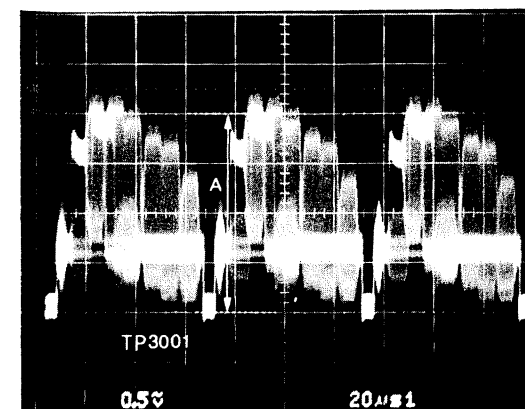
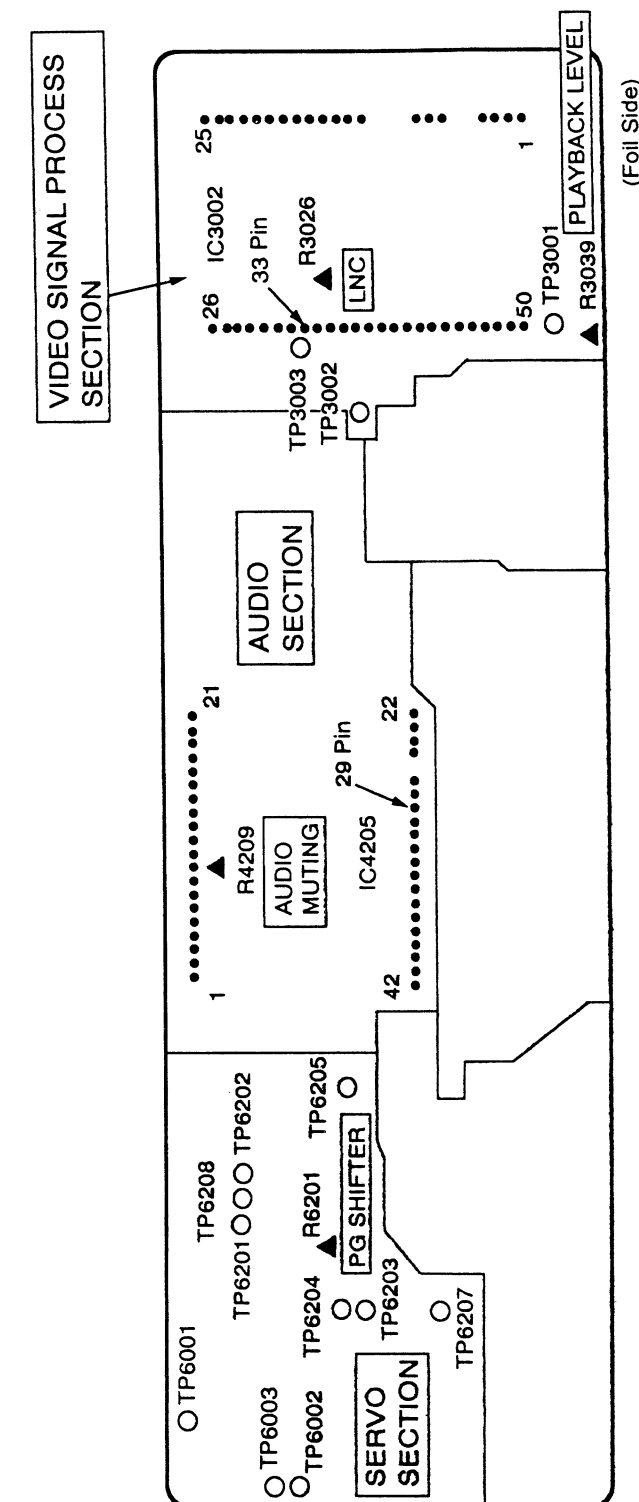
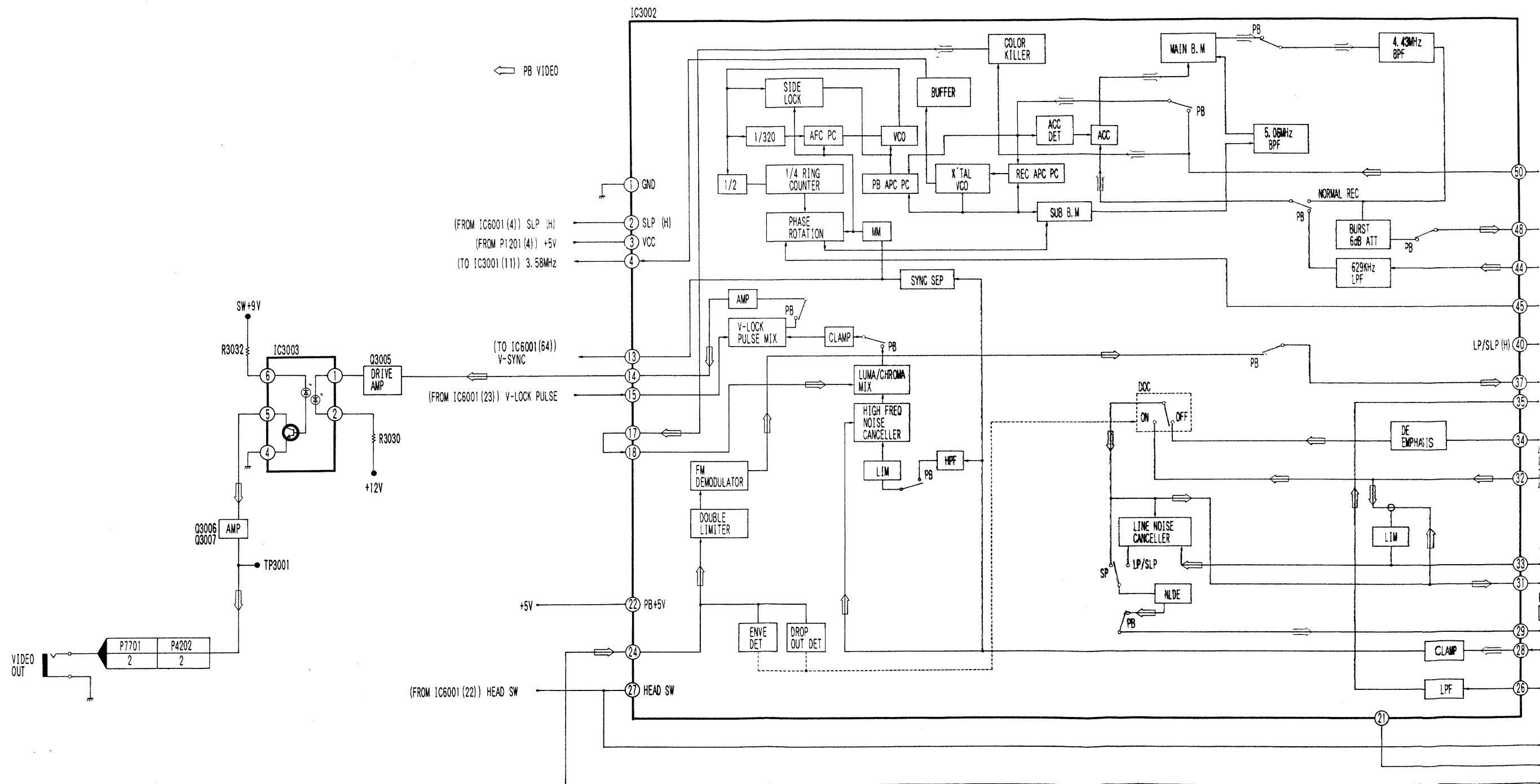


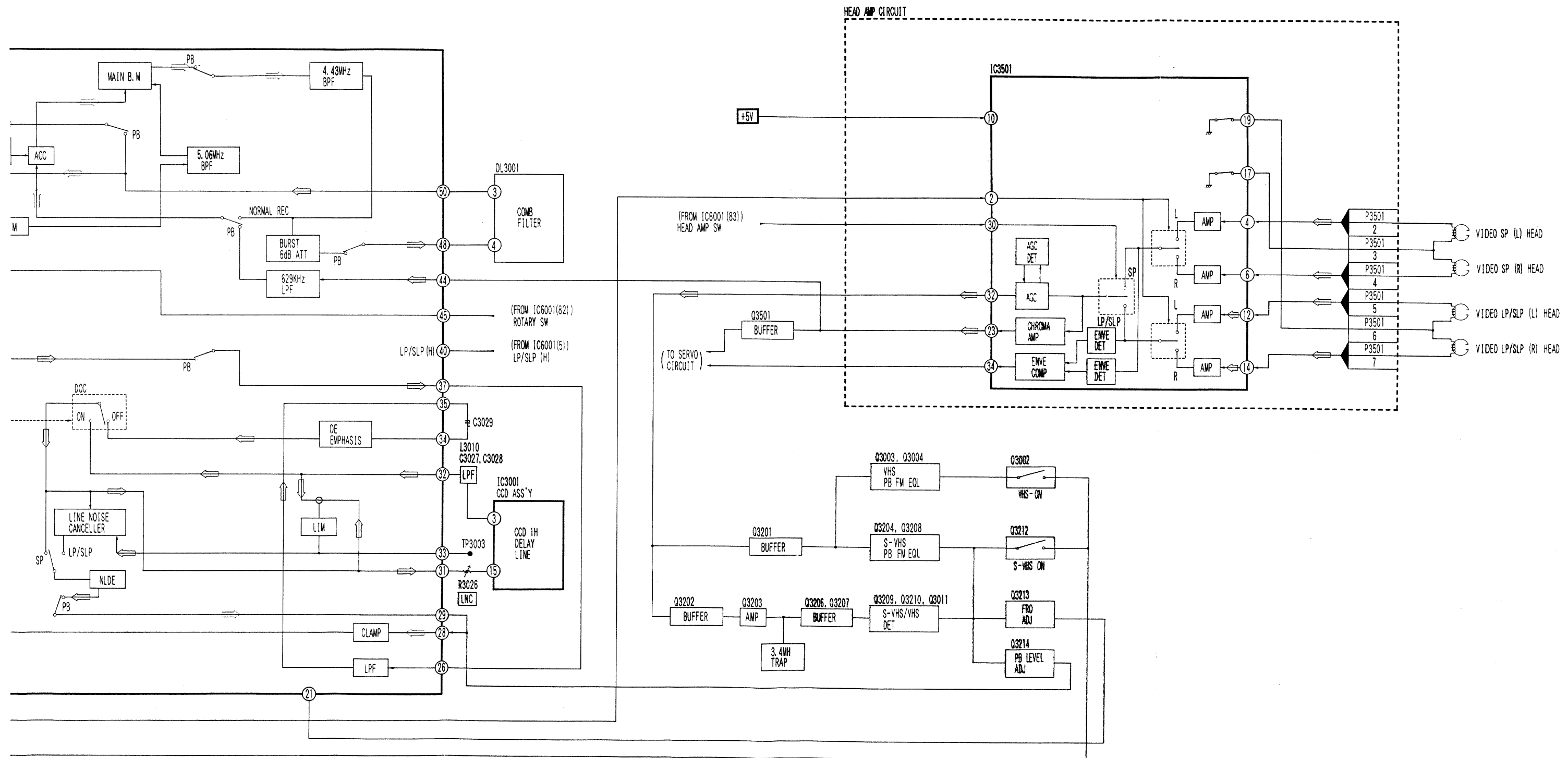
Fig. E6

4.5. LOCATION OF TEST POINTS AND ADJUSTMENT POINTS

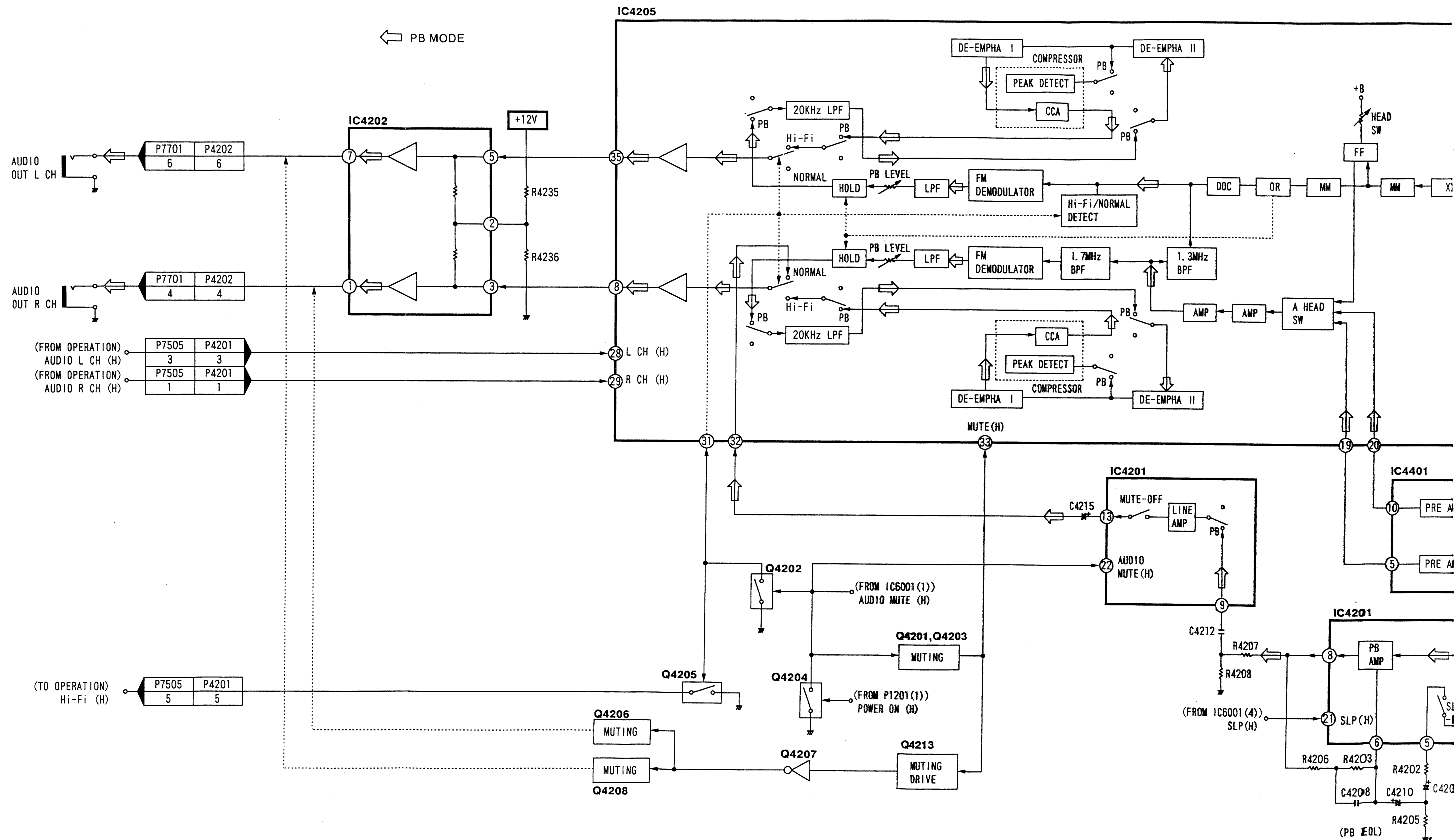


5.1 BLOCK DIAGRAM VIDEO

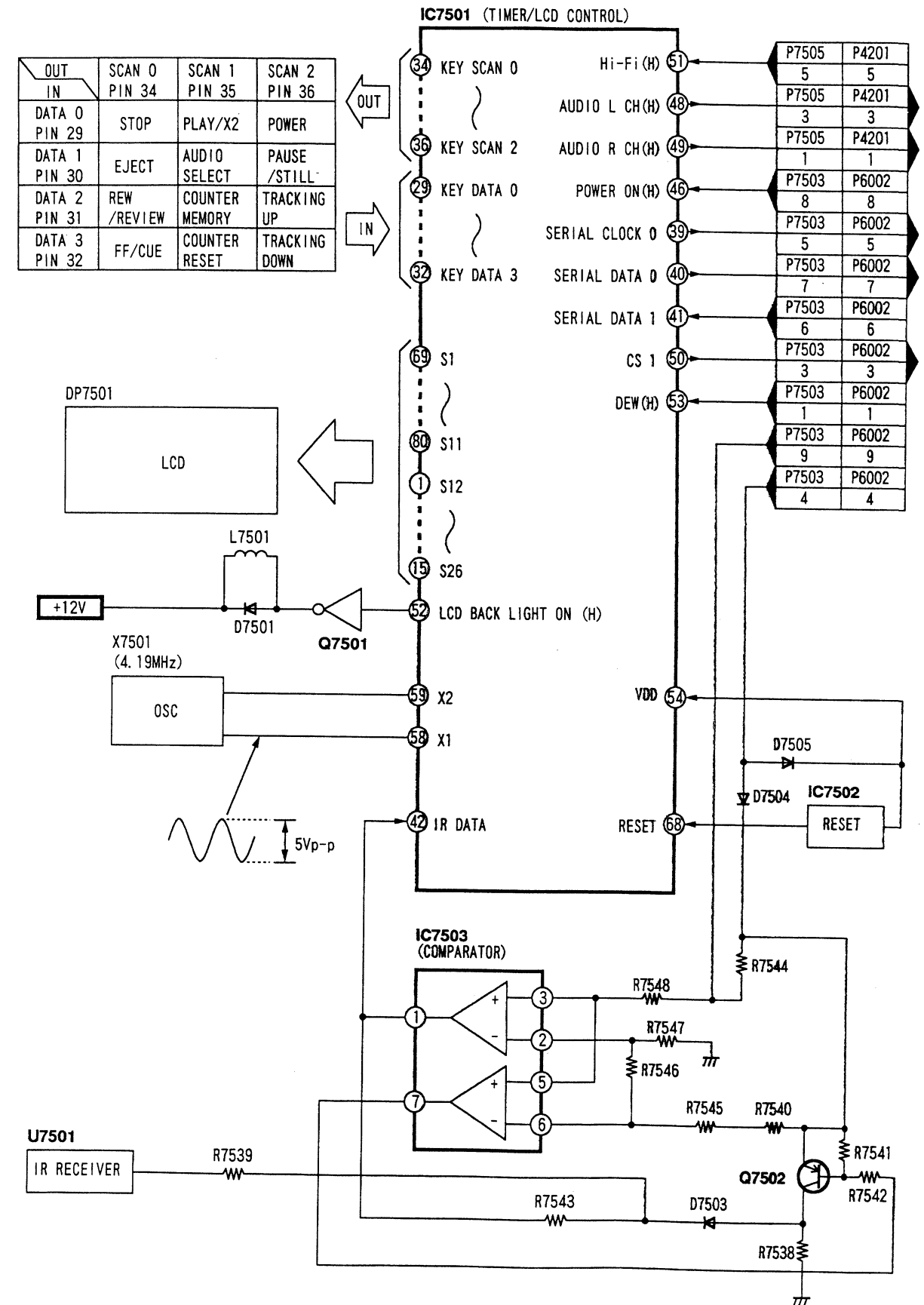
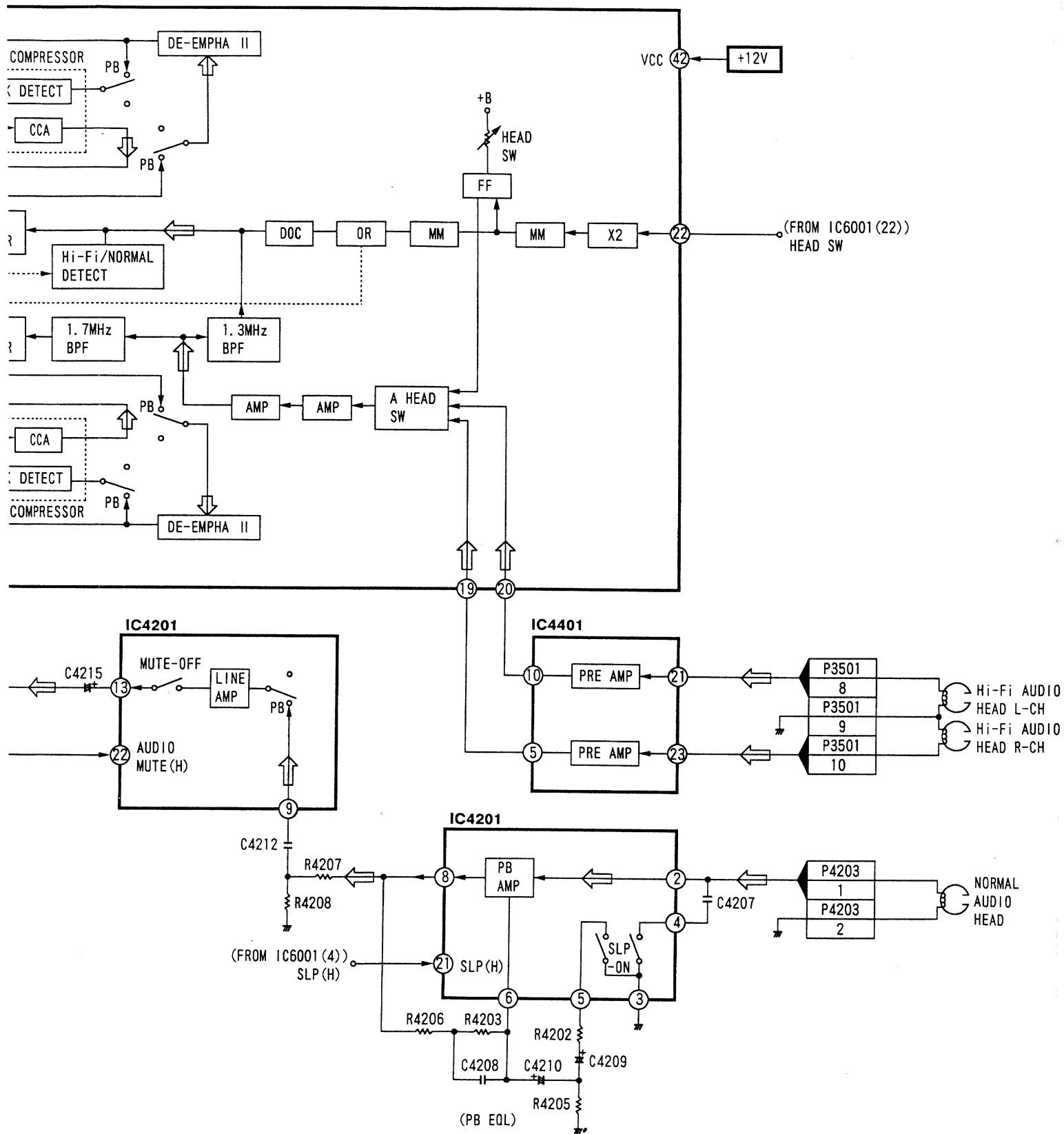




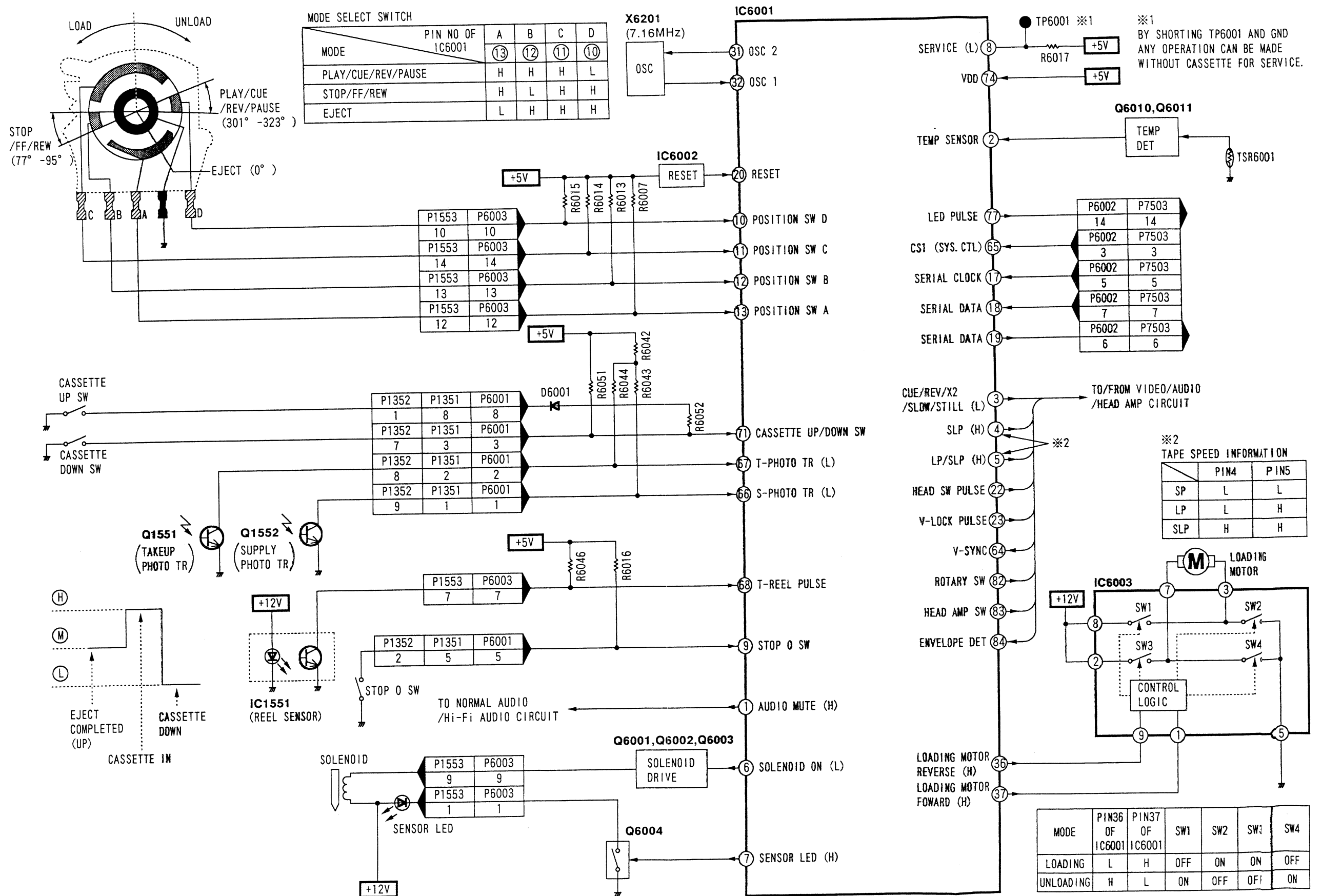
5.2 BLOCK DIAGRAM AUDIO



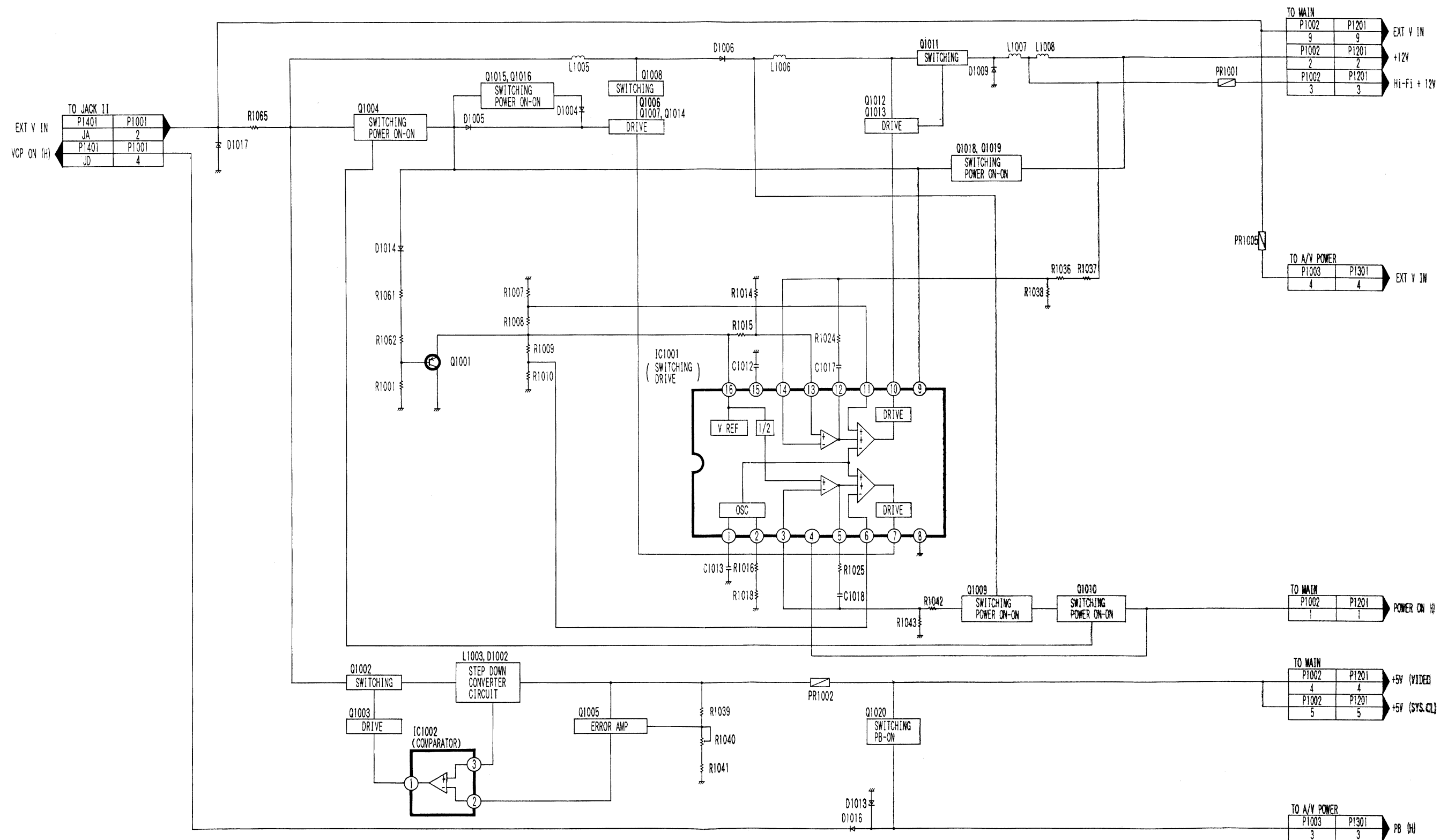
5.3 BLOCK DIAGRAM OPERATION



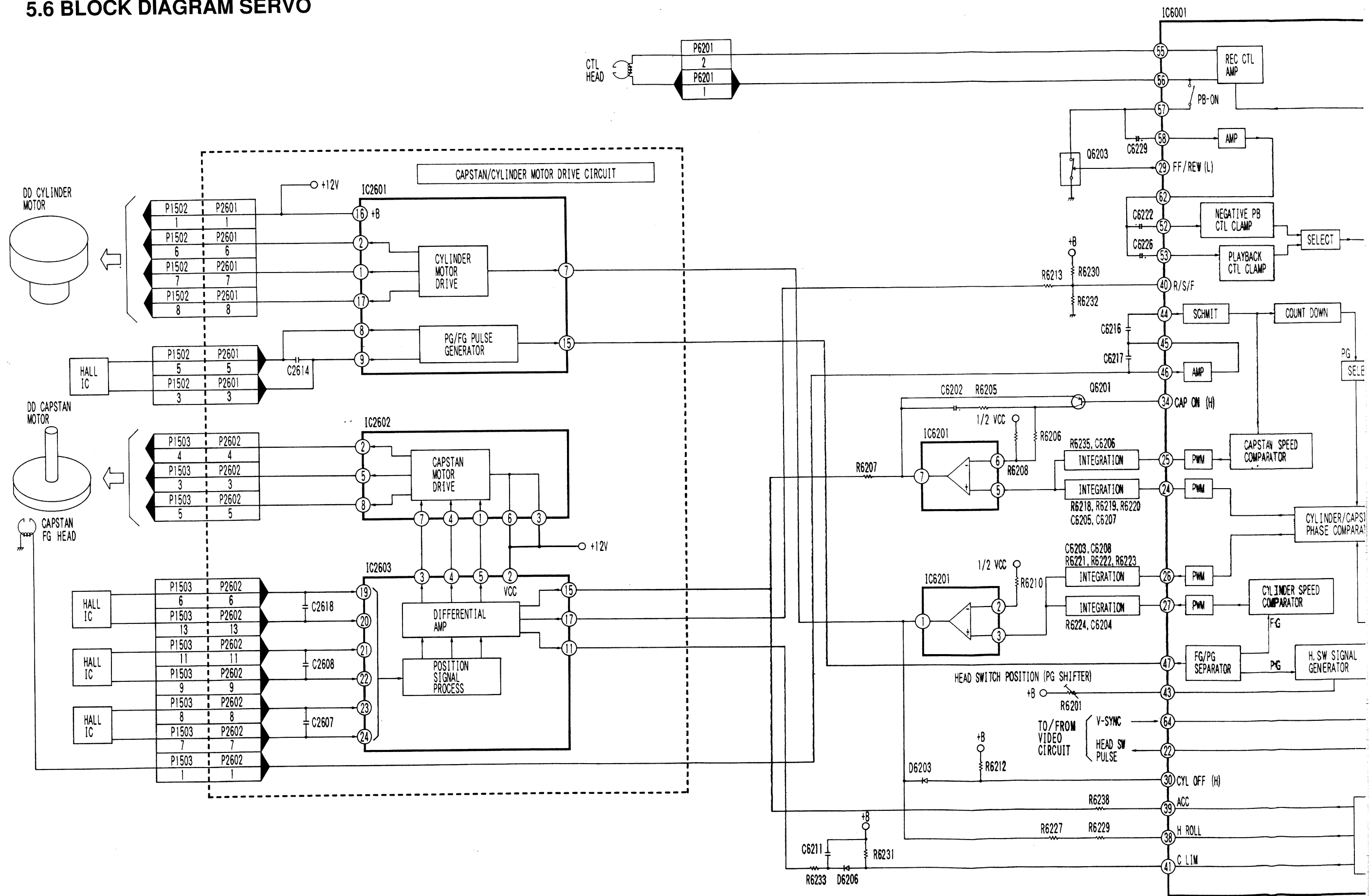
5.4 BLOCKDIAGRAM SYSTEMCONTROL

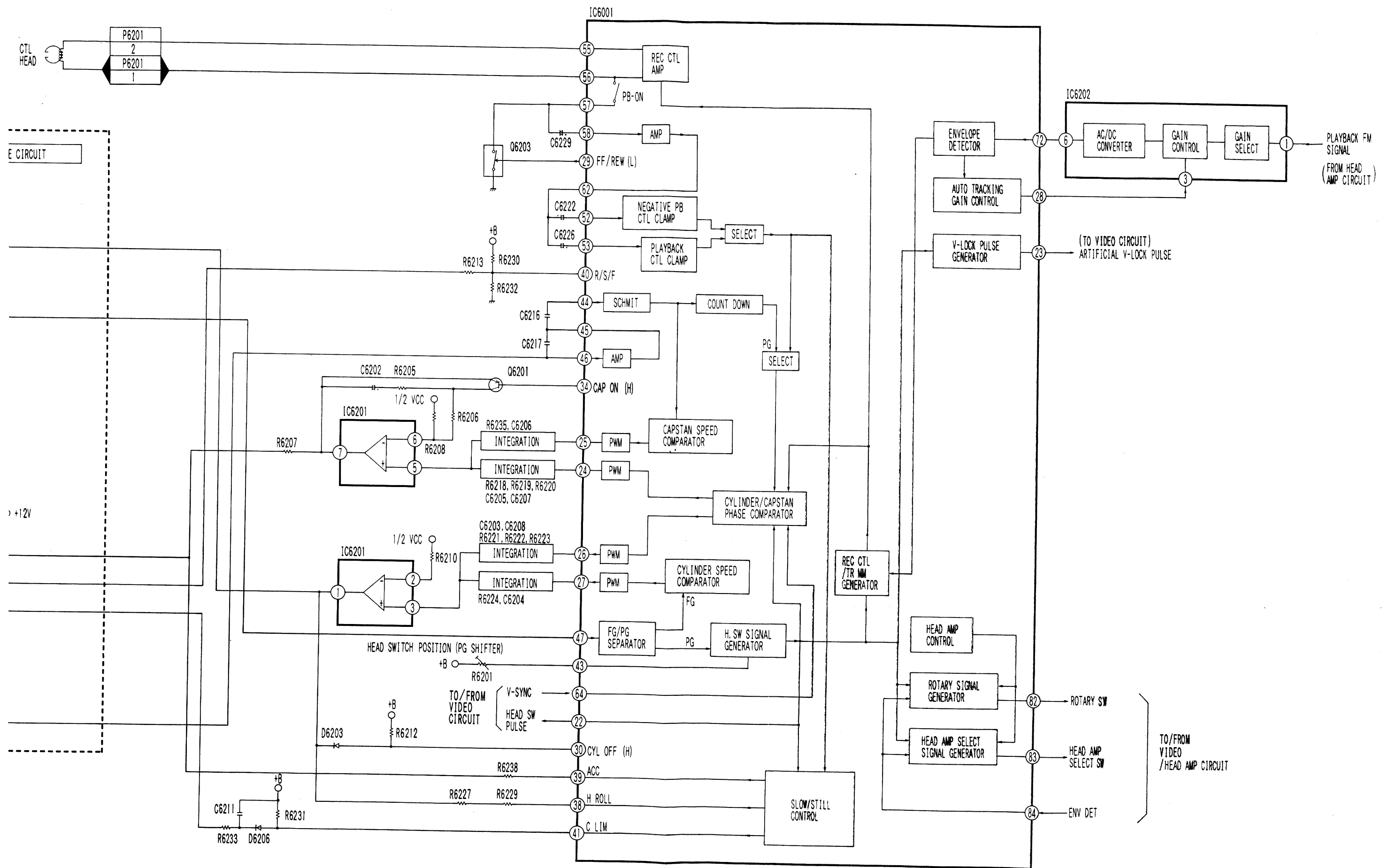


5.5 BLOCKDIAGRAM POWER

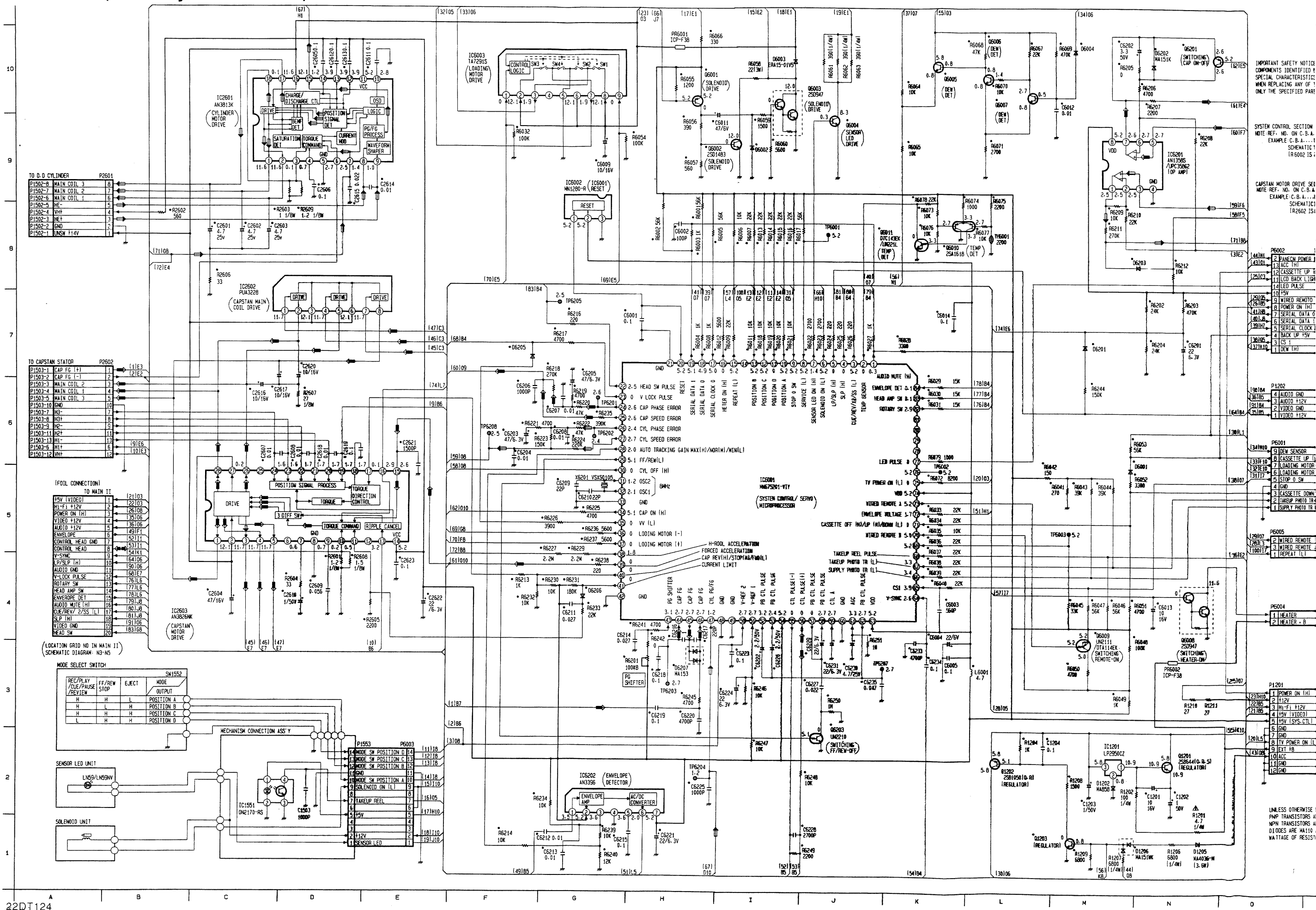


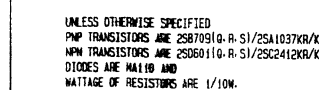
5.6 BLOCK DIAGRAM SERVO



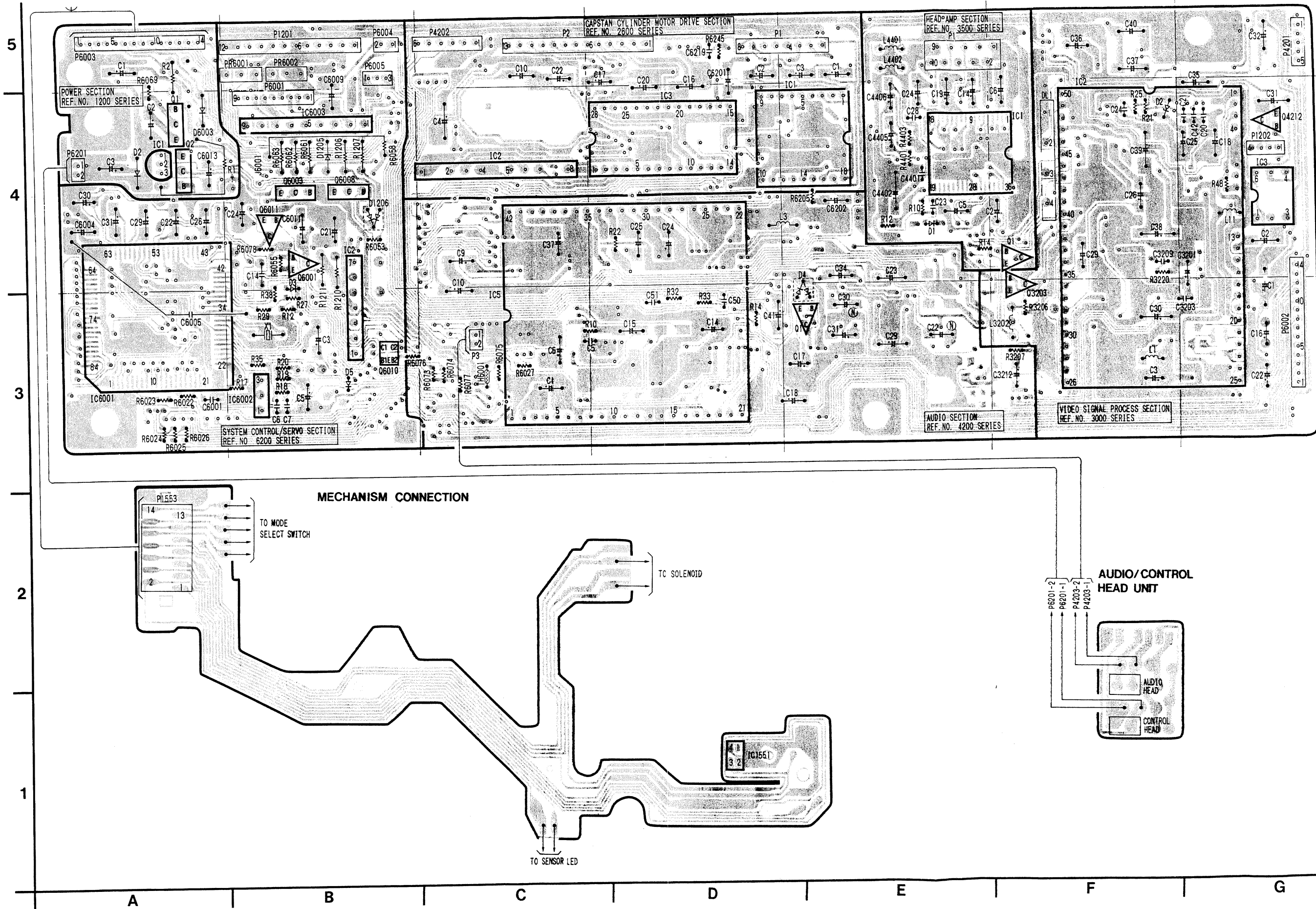


6.1 MAIN I (servo/system control)

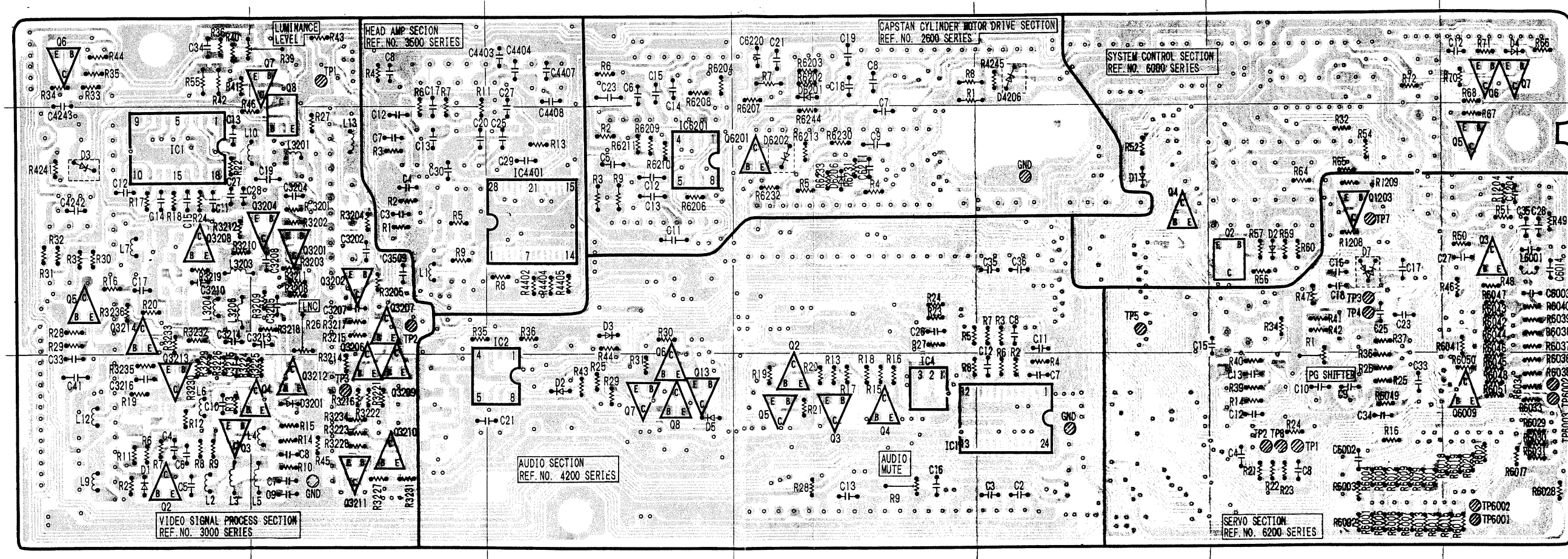




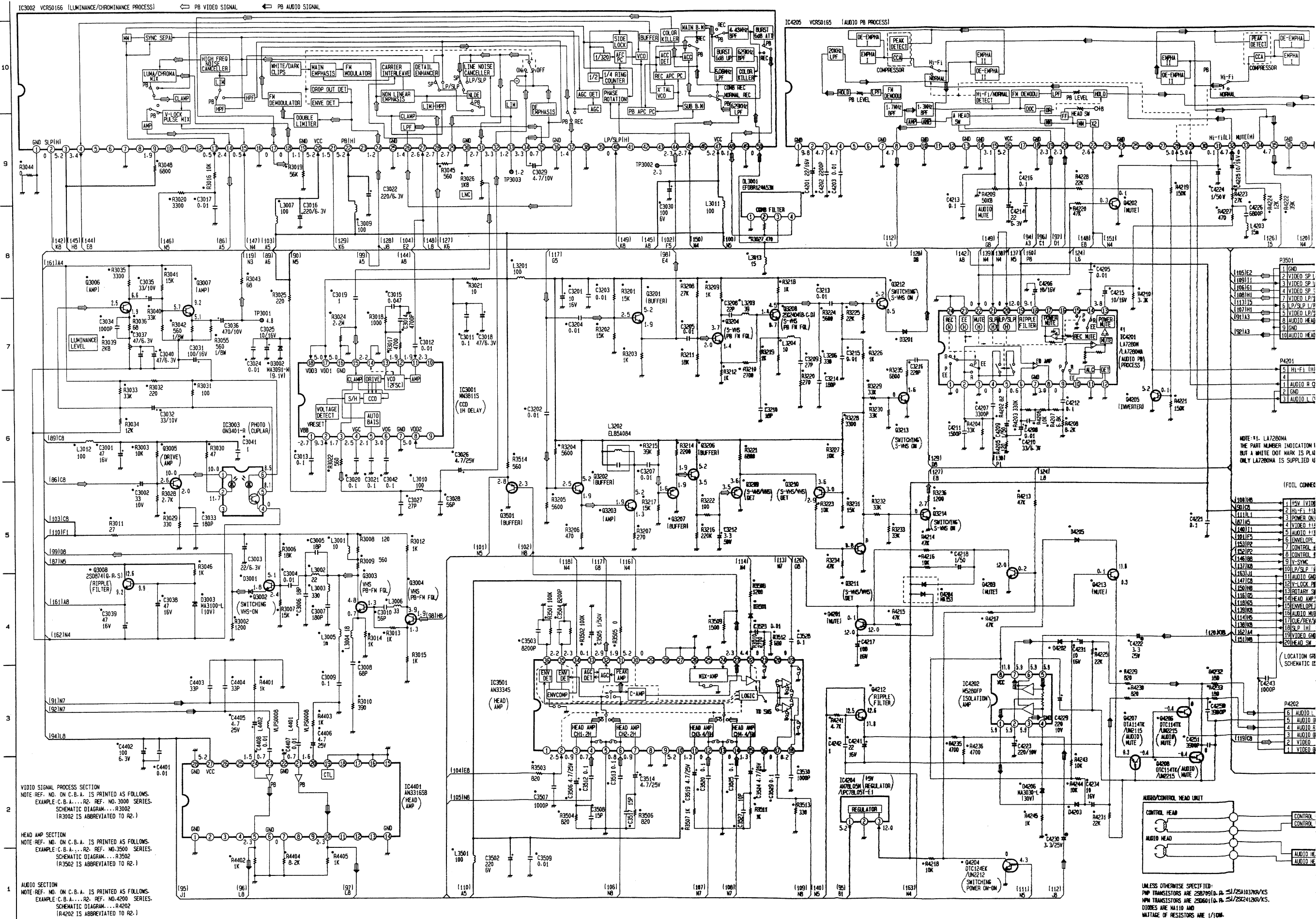
7.1 MAIN PANEL (component side)

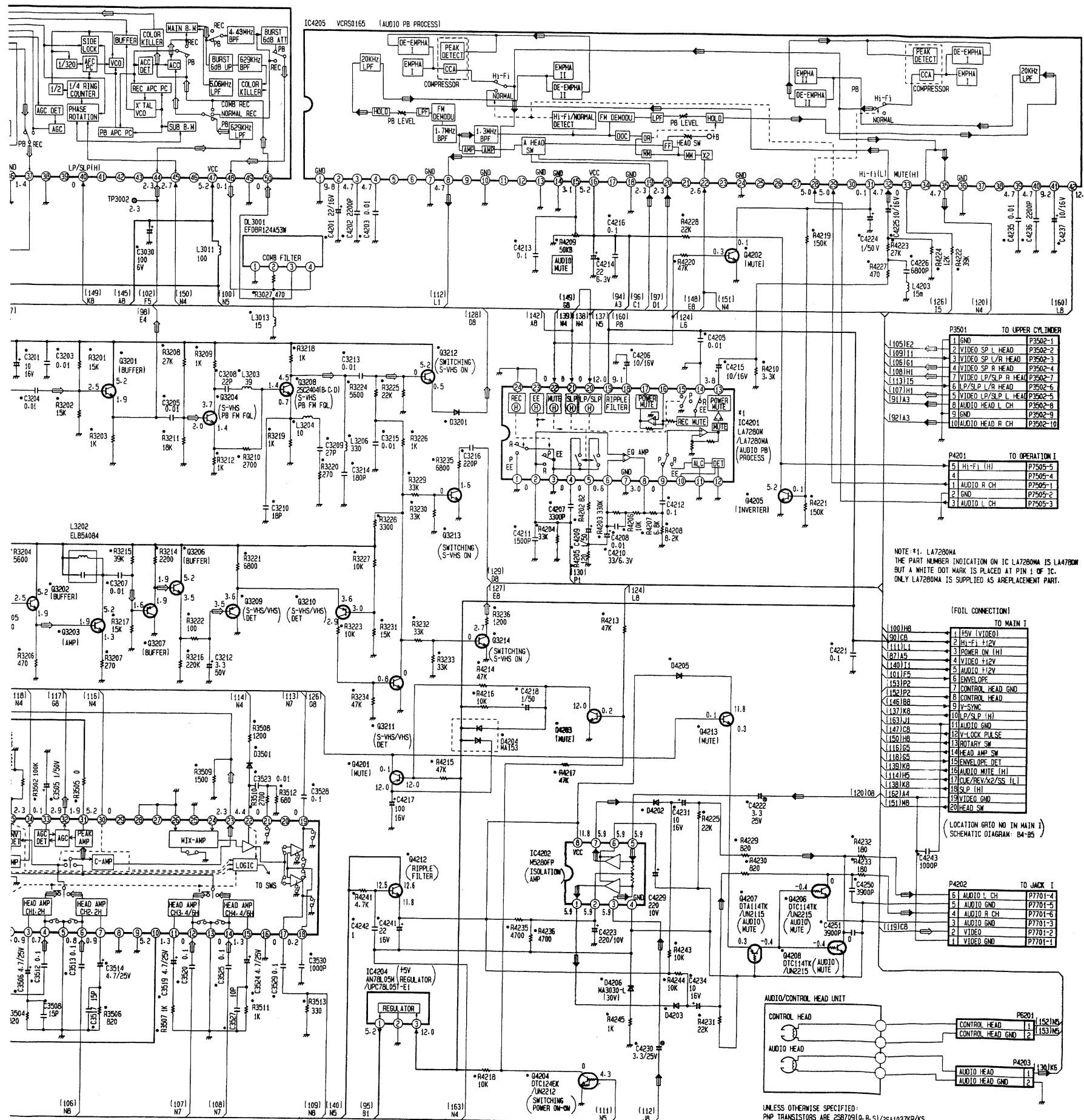


7.2 MAIN PANEL (solder side)



6.2 MAIN II (audio/video process)





NOTE: MARK ∇ IS LEADLESS
(CHIP) COMPONENT.

- NOTE:
- DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AWAYED SINCE THIS DRAWING WAS PREPARED.
 - MAINTAIN ORIGINAL FUNCTION AND RELIABILITY OF REPAIRED UNITS. ONLY USE ORIGINAL REPLACEMENT PARTS WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THE SERVICE MANUAL.

NOTE: HOW TO READ CONVERGED LINES
1100104
LOCATION GRID OF THE OTHER END OF THE LINE
LINE NUMBER

- TEST POINT INFORMATION
- ①: INDICATION OF TEST POINT WITH A JUMPER WIRE ACROSS A HOLE IN P.C.B.
 - ②: USED FOR THE INDICATION OF TEST POINT WITH COMPONENT LEAD ON FOIL SIDE.
 - ③: USED FOR THE INDICATION OF TEST POINT WITH NO TEST PIN.
 - ④: USED FOR THE INDICATION OF TEST POINT WITH TEST PIN.

NOTE: IC4201, LA7280M
THE PART NUMBER INDICATION ON IC LA7280M IS LA7280M
BUT A WHITE DOT MARK IS PLACED AT PIN 1 OF IC.
ONLY LA7280M IS SUPPLIED AS REPLACEMENT PART.

(FOIL CONNECTION)

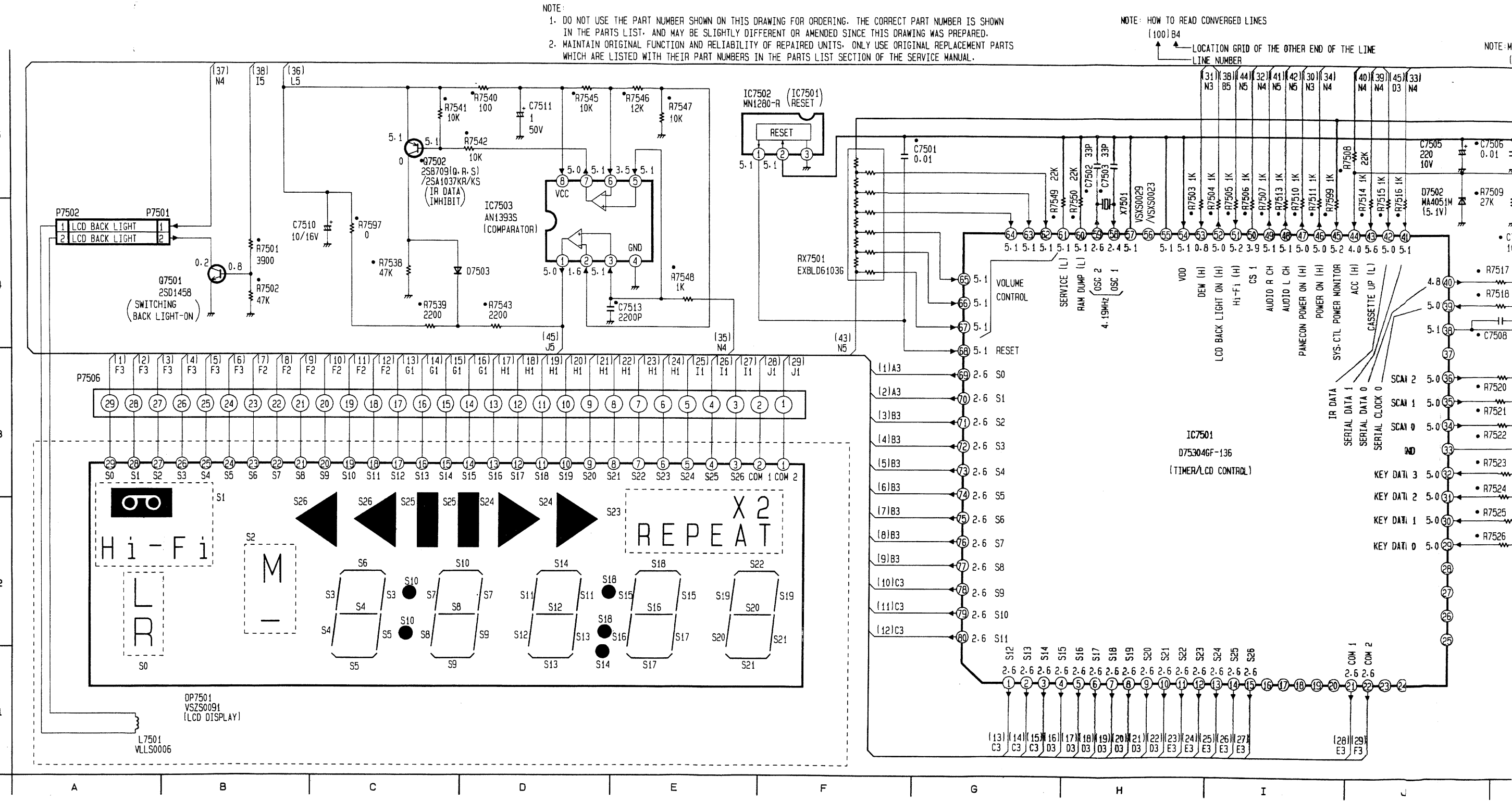
TO MAIN 1	TO MAIN 1
1 HS-V (VIDEO)	2 HI-FI +12V
3 HI-FI +12V	4 VIDEO +12V
5 VIDEO +12V	6 ENVELOPE
7 CONTROL HEAD GND	8 CONTROL HEAD
9 V-SYNC	10 L2/S/P (H)
11 AUDIO GND	12 V-LOCK PULSE
13 ROTARY SW	14 HEAD AMP SW
15 ENVELOPE DET	16 AUDIO MUTE (H)
17 CUR/REV/X2/SS (L)	18 SLP (H)
19 VIDEO GND	20 HEAD SW

(LOCATION GRID NO IN MAIN 1)
SCHEMATIC DIAGRAM: 84-85

TO JACK 1	TO JACK 1
1 AUDIO L CH	2 AUDIO R CH
3 AUDIO GND	4 AUDIO R CH
5 AUDIO GND	6 VIDEO
7 VIDEO	8 VIDEO GND

UNLESS OTHERWISE SPECIFIED:
PNP TRANSISTORS ARE 2SB799 (Q, R, S) / 2SA1037 (K, W, S)
NPN TRANSISTORS ARE 2SD6011 (Q, R, S) / 2SC2412 (K, W, S)
DIODES ARE MA110 AND
WATTAGE OF RESISTORS ARE 1/10W.

6.3 OPERATION I

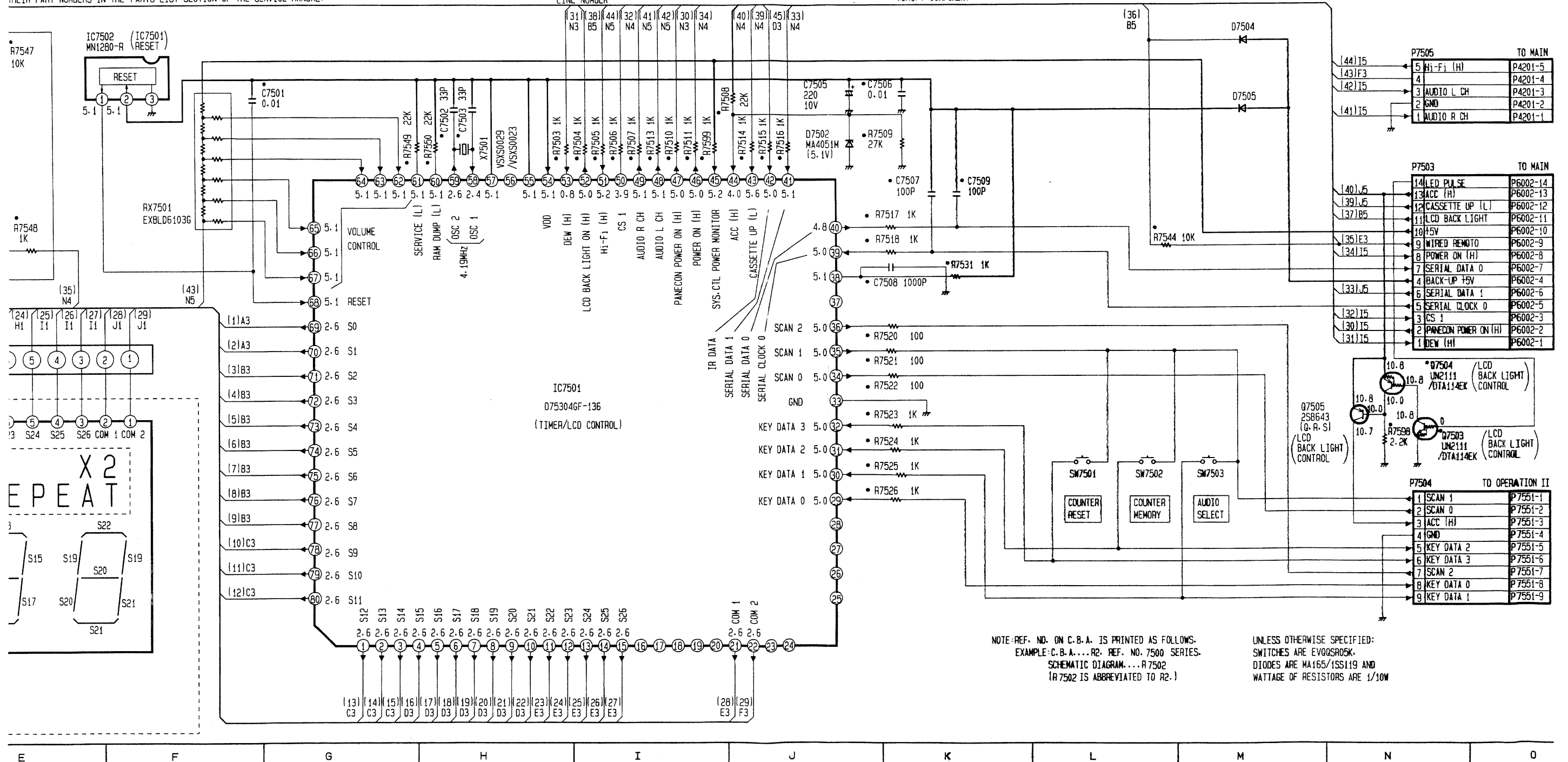


NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN
MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.
TION AND RELIABILITY OF REPAIRED UNITS. ONLY USE ORIGINAL REPLACEMENT PARTS
THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THE SERVICE MANUAL.

NOTE: HOW TO READ CONVERGED LINES

(100) B4
LOCATION GRID OF THE OTHER END OF THE LINE
LINE NUMBER

NOTE: MARK "*" IS LEADLESS
(CHIP) COMPONENT.



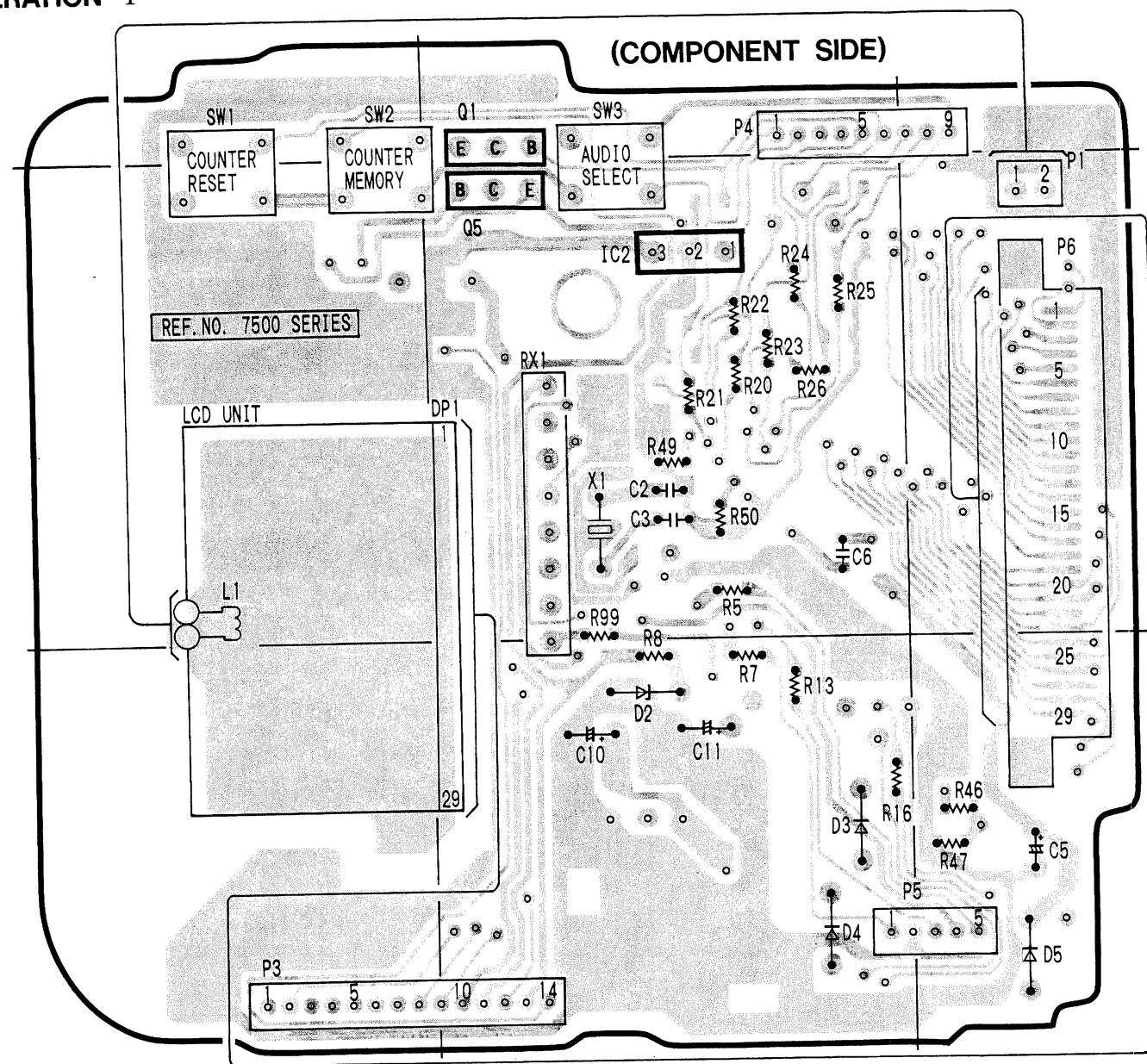
7.3 PANELS OPERATION I AND II

OPERATION I

3

2

1



A

B

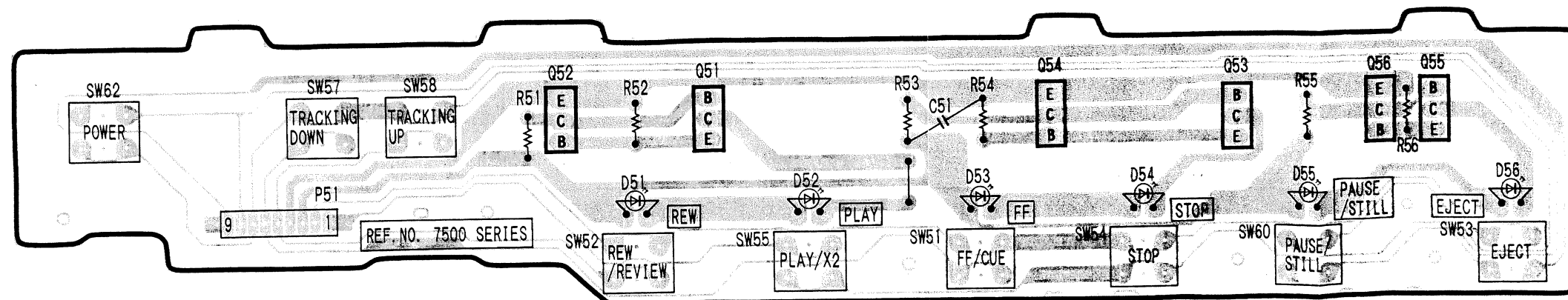
C

D

E

OPERATION II

1



A

B

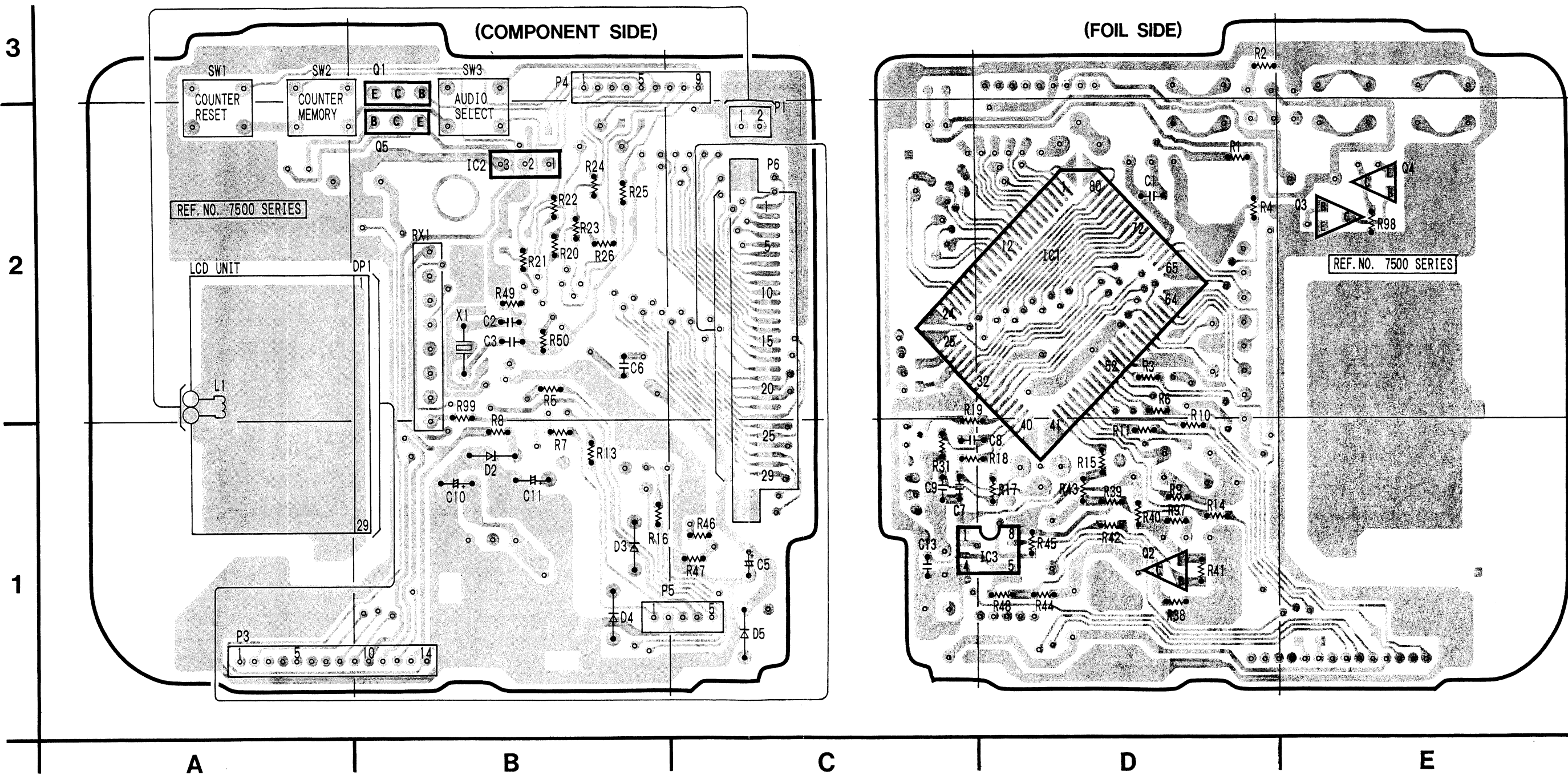
33

C

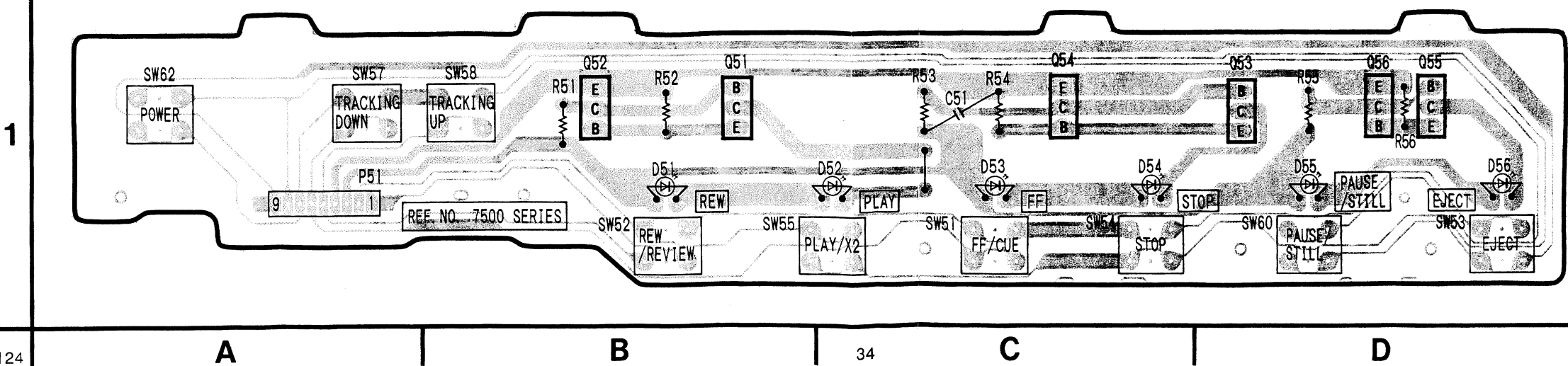
D

7.3 PANELS OPERATION I AND II

OPERATION I



OPERATION II



6.4 OPERATION II

5

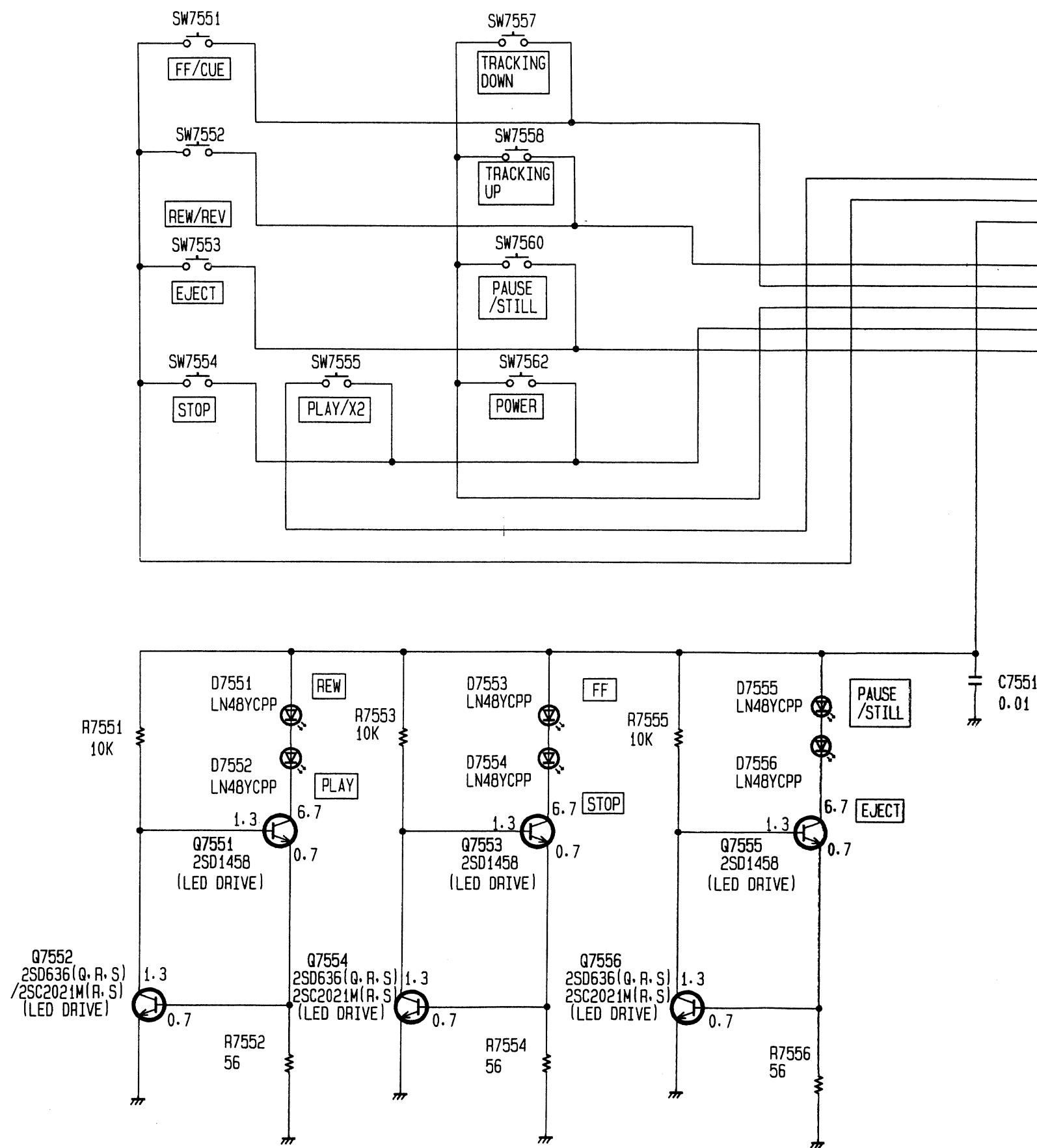
4

3

2

1

PCS 65 834



P7551	TO OPERATION
1	SCAN 1
2	SCAN 0
3	ACC (H)
4	GND
5	KEY DATA 2
6	KEY DATA 3
7	SCAN 2
8	KEY DATA 0
9	KEY DATA 1

NOTE:

- DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS LISTED IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING IS A REPAIR GUIDE.
- MAINTAIN ORIGINAL FUNCTION AND RELIABILITY OF REPAIRED UNITS. ONLY USE ORIGINAL PARTS WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THE REPAIR GUIDE.

NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A....R2, REF. NO. 7500 SERIES.
SCHEMATIC DIAGRAM....R7502
(R7502 IS ABBREVIATED TO R2.)

UNLESS OTHERWISE SPECIFIED:
SWITCHES VEQSR05K
WATTAGE OF RESISTORS ARE 1/4W.

A

B

C

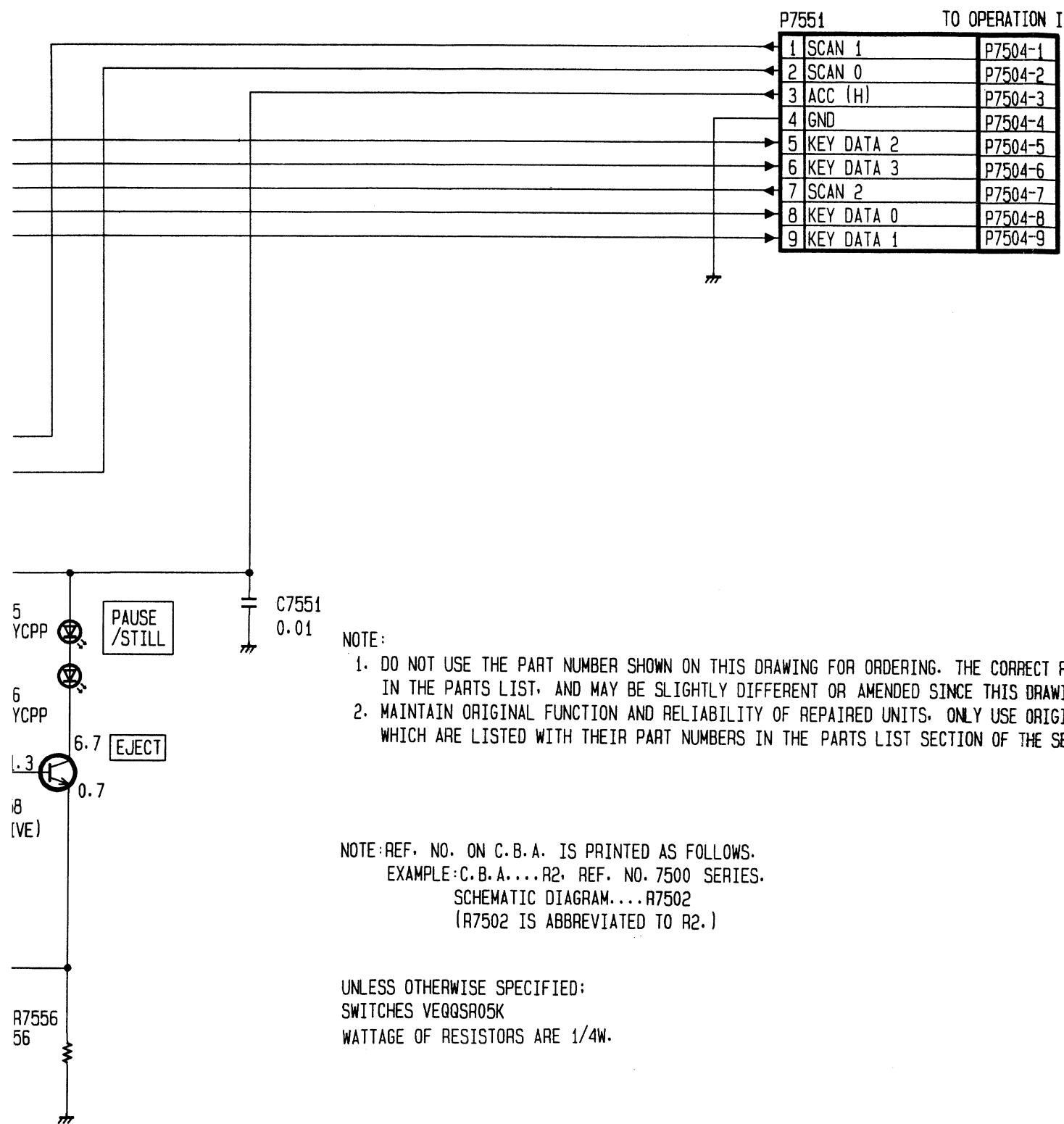
D

E

35

F

G



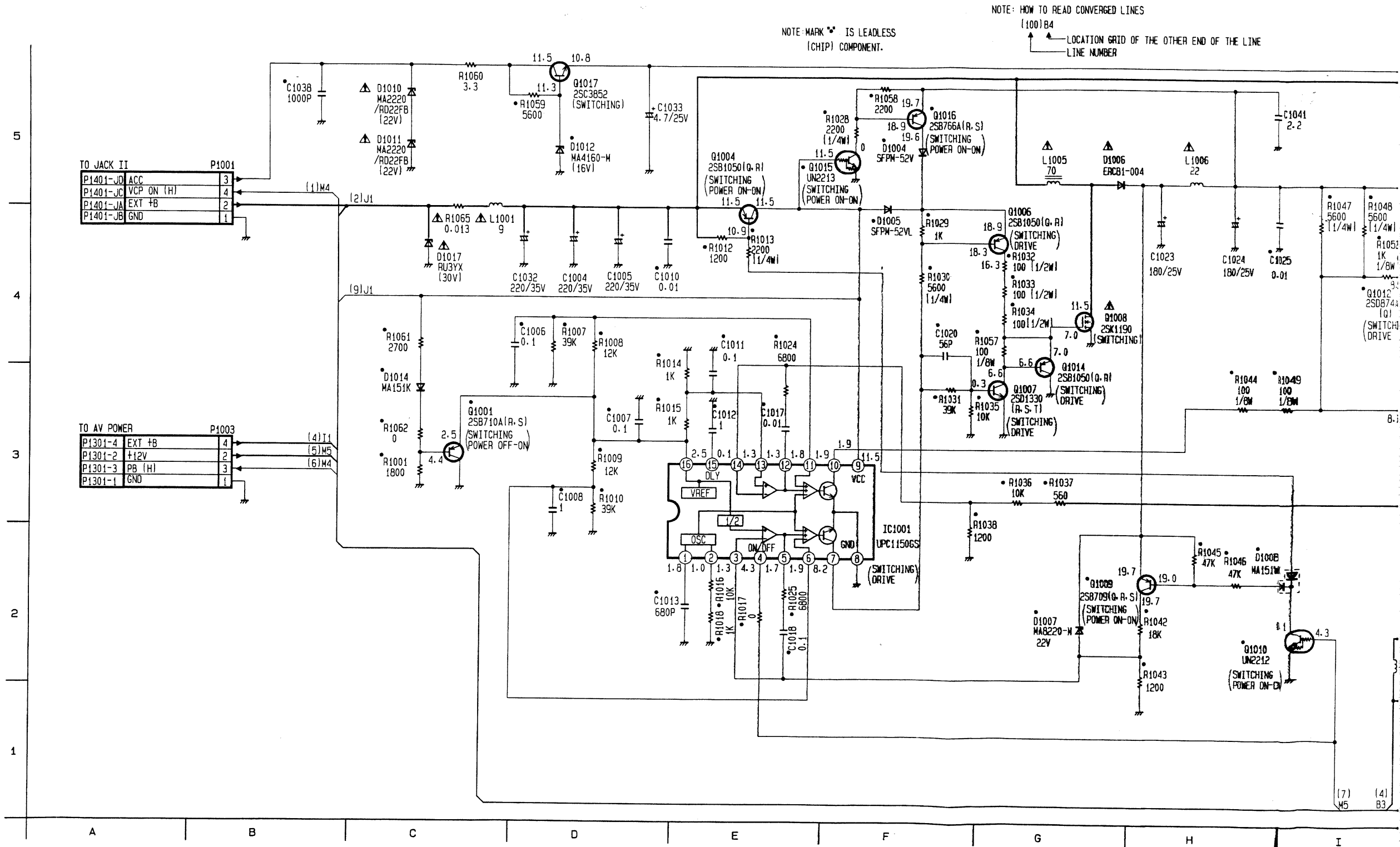
NOTE:

1. DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.
2. MAINTAIN ORIGINAL FUNCTION AND RELIABILITY OF REPAIRED UNITS. ONLY USE ORIGINAL REPLACEMENT PARTS WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THE SERVICE MANUAL.

NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
 EXAMPLE: C.B.A....R2, REF. NO. 7500 SERIES.
 SCHEMATIC DIAGRAM....R7502
 (R7502 IS ABBREVIATED TO R2.)

UNLESS OTHERWISE SPECIFIED:
 SWITCHES VEQQSR05K
 WATTAGE OF RESISTORS ARE 1/4W.

6.5 POWER SUPPLY



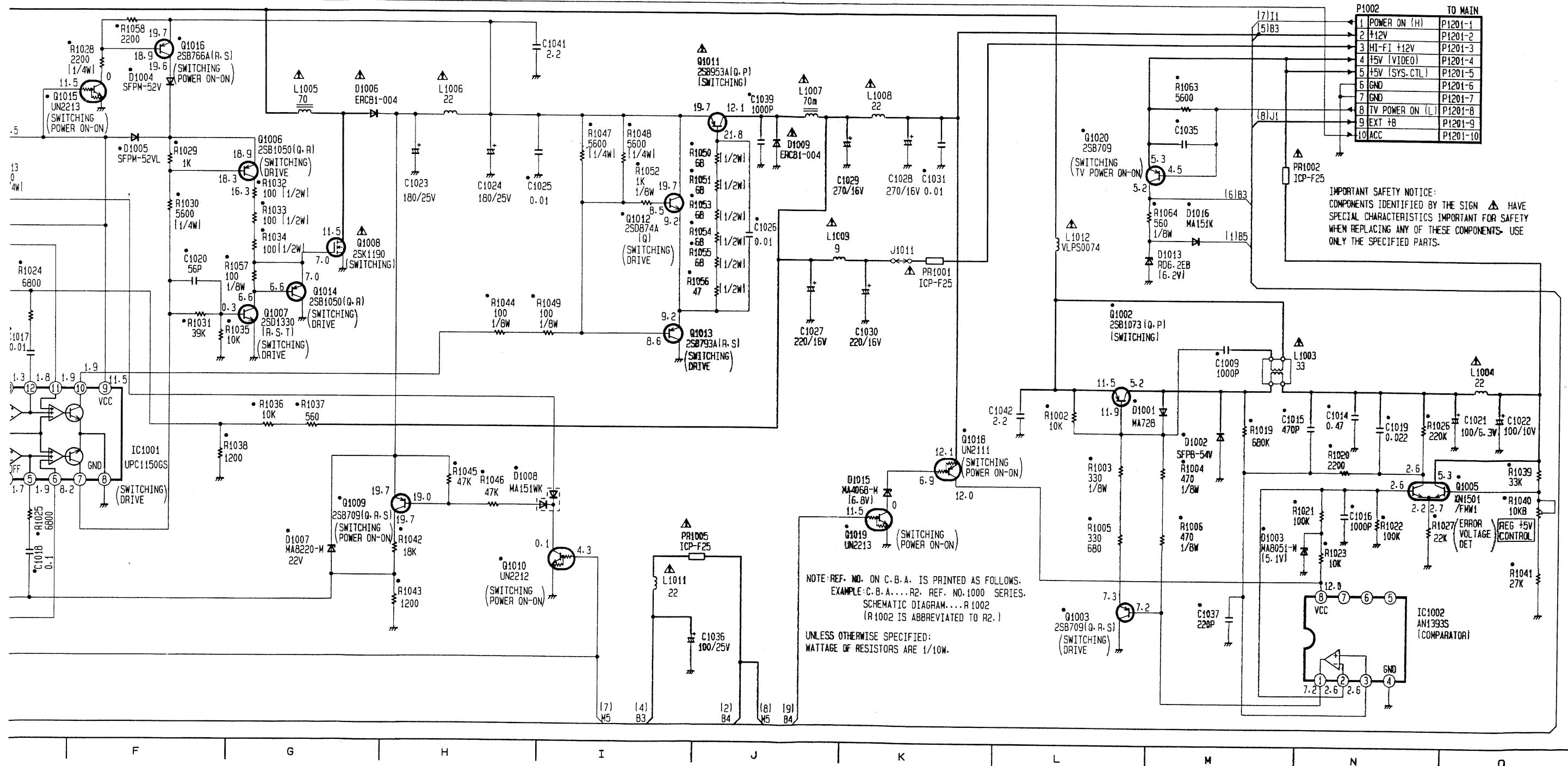
NOTE: MARK "•" IS LEADLESS
(CHIP) COMPONENT.

NOTE: HOW TO READ CONVERGED LINES

100184
LOCATION GRID OF THE OTHER END OF THE LINE
LINE NUMBER

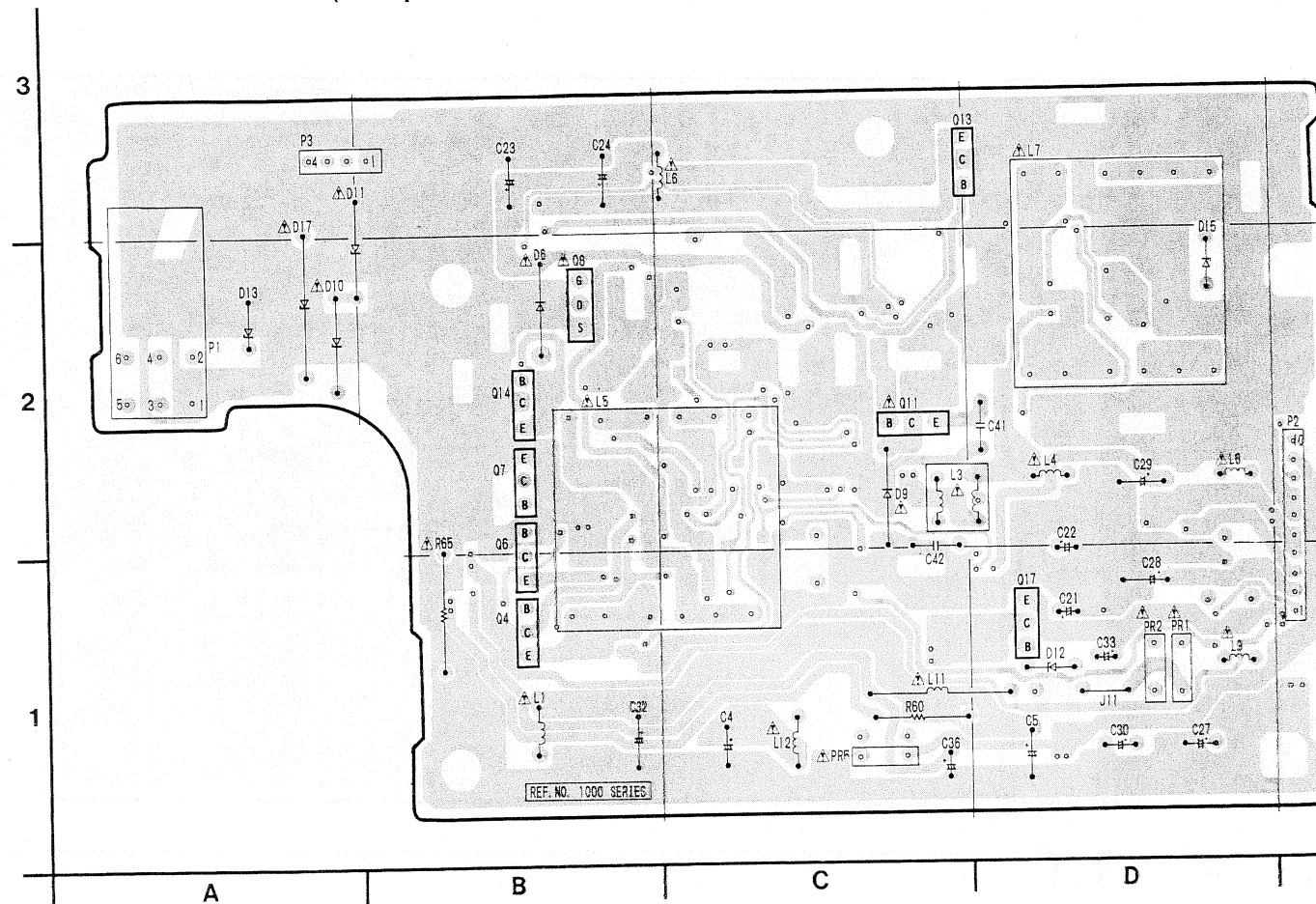
NOTE:

1. DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.
2. MAINTAIN ORIGINAL FUNCTION AND RELIABILITY OF REPAIRED UNITS. ONLY USE ORIGINAL REPLACEMENT PARTS WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THE SERVICE MANUAL.

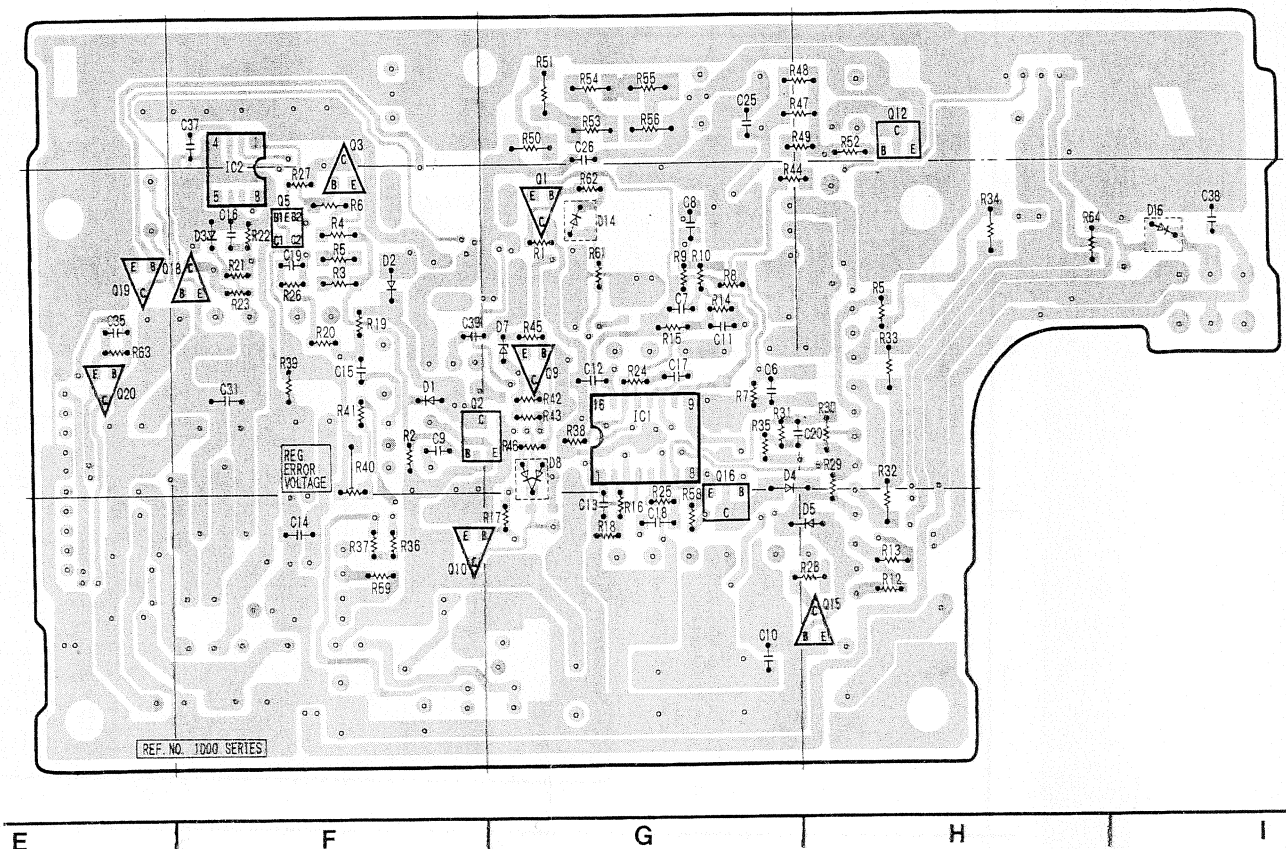


7.4 PANEL POWER SUPPLY 7.5 PANEL A/V POWER 7.6 PANELS JACK I,II

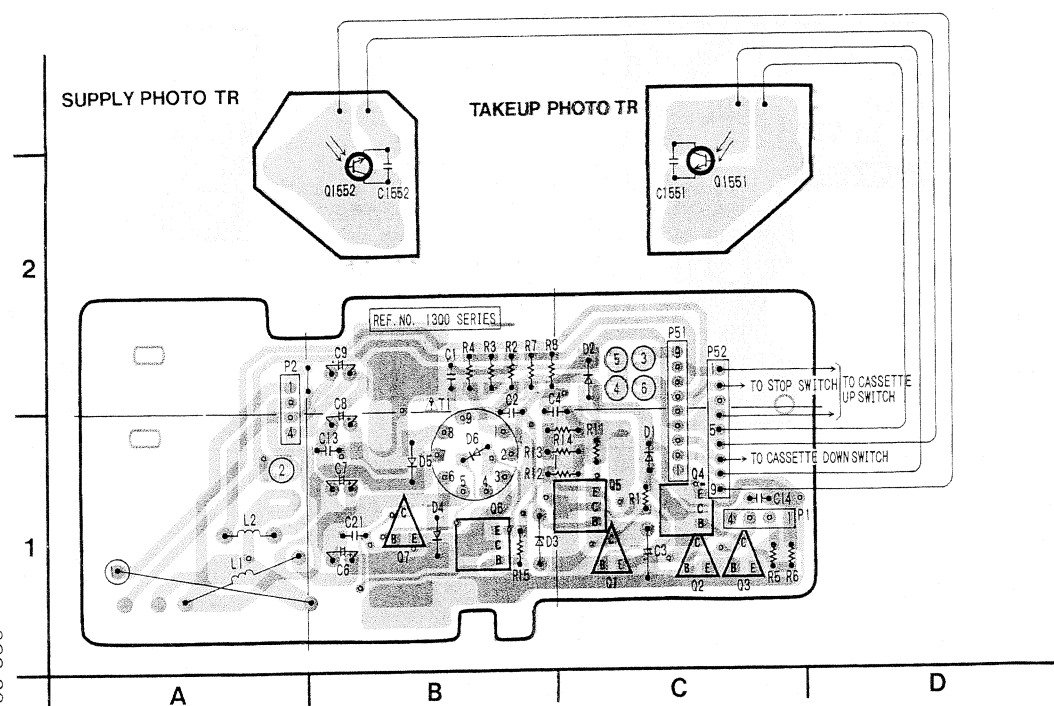
POWER SUPPLY (component side)



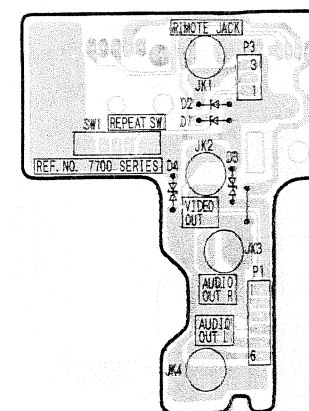
POWER SUPPLY (solder side)



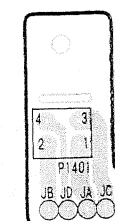
A/V POWER SUPPLY



JACK I

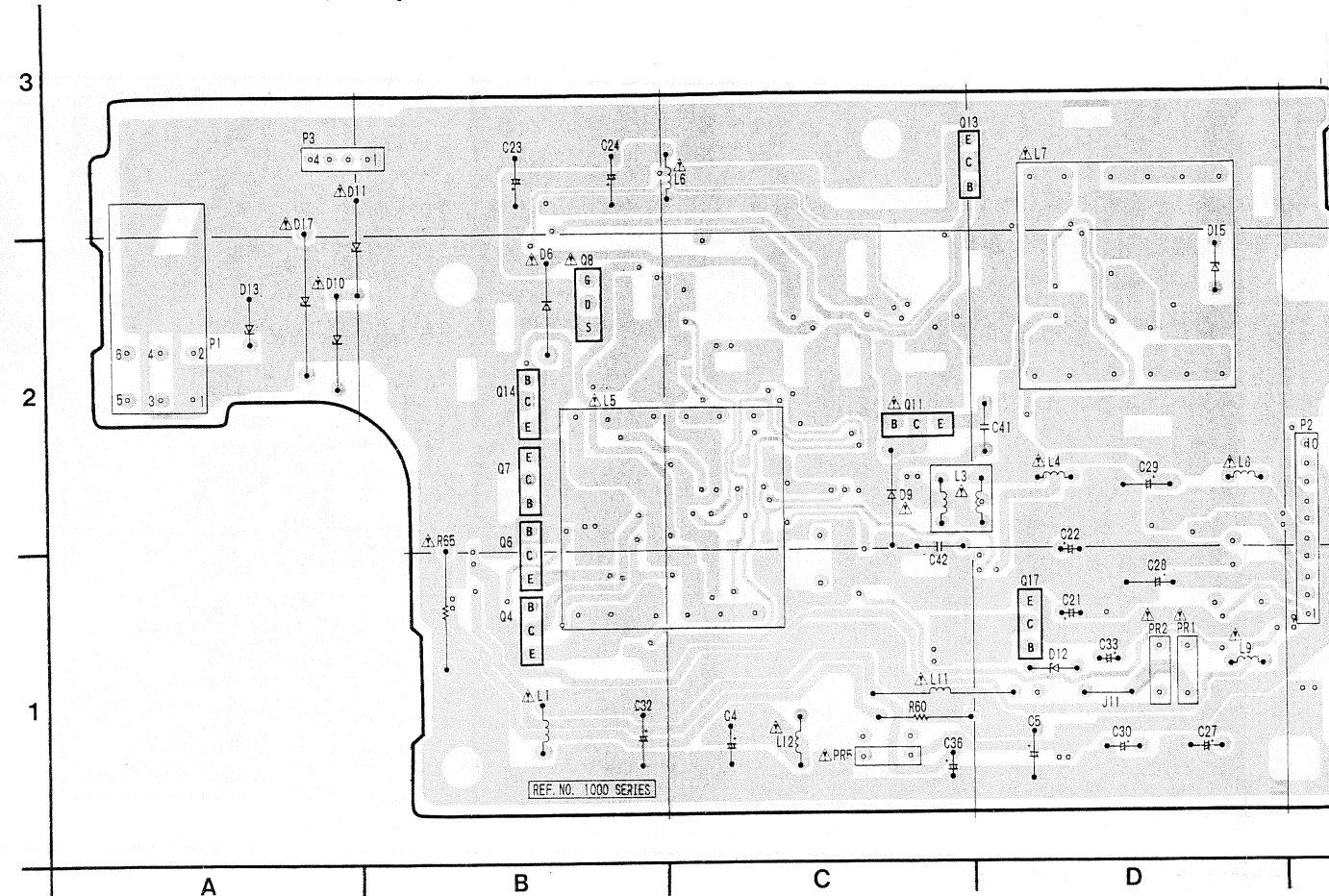


JACK 11

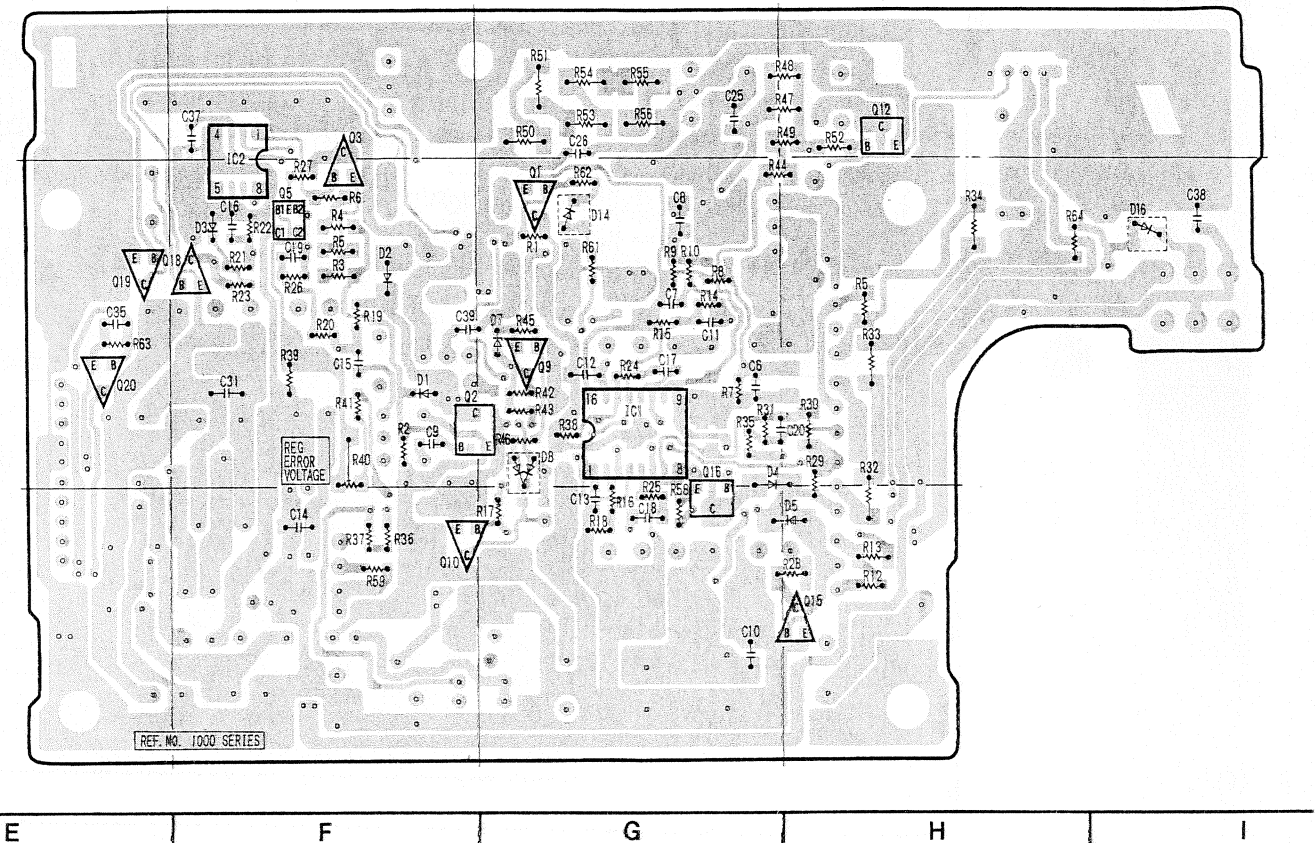


7.4 PANEL POWER SUPPLY 7.5 PANEL A/V POWER 7.6 PANELS JACK I, II

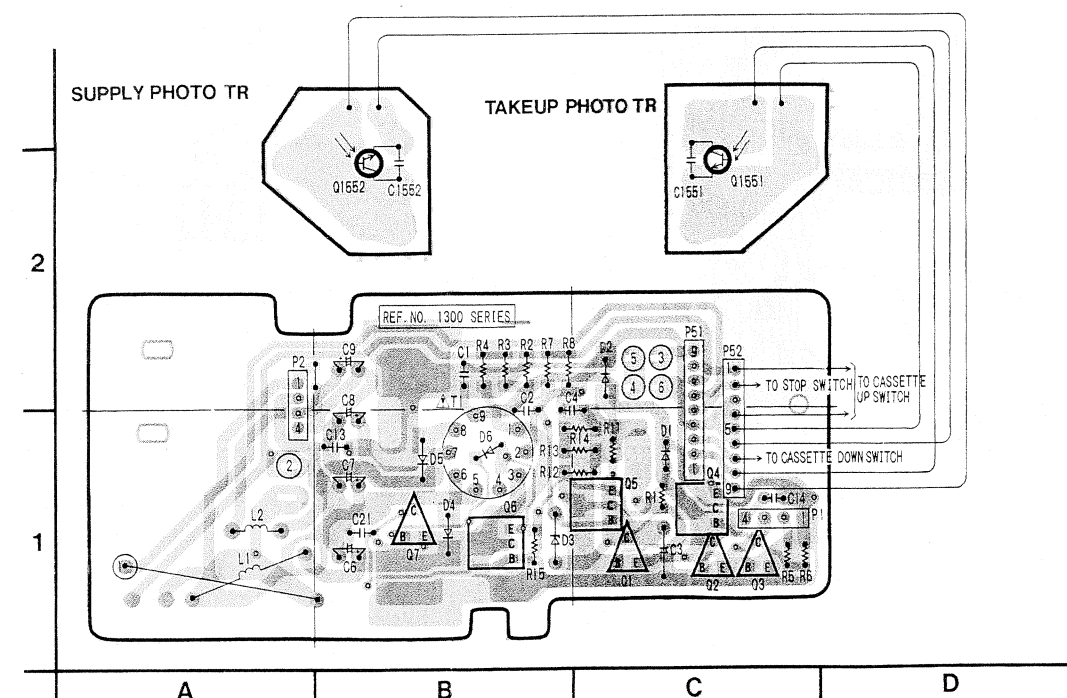
POWER SUPPLY (component side)



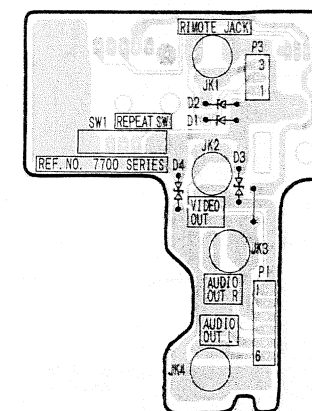
POWER SUPPLY (solder side)



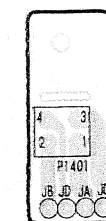
A/V POWER SUPPLY



JACK I



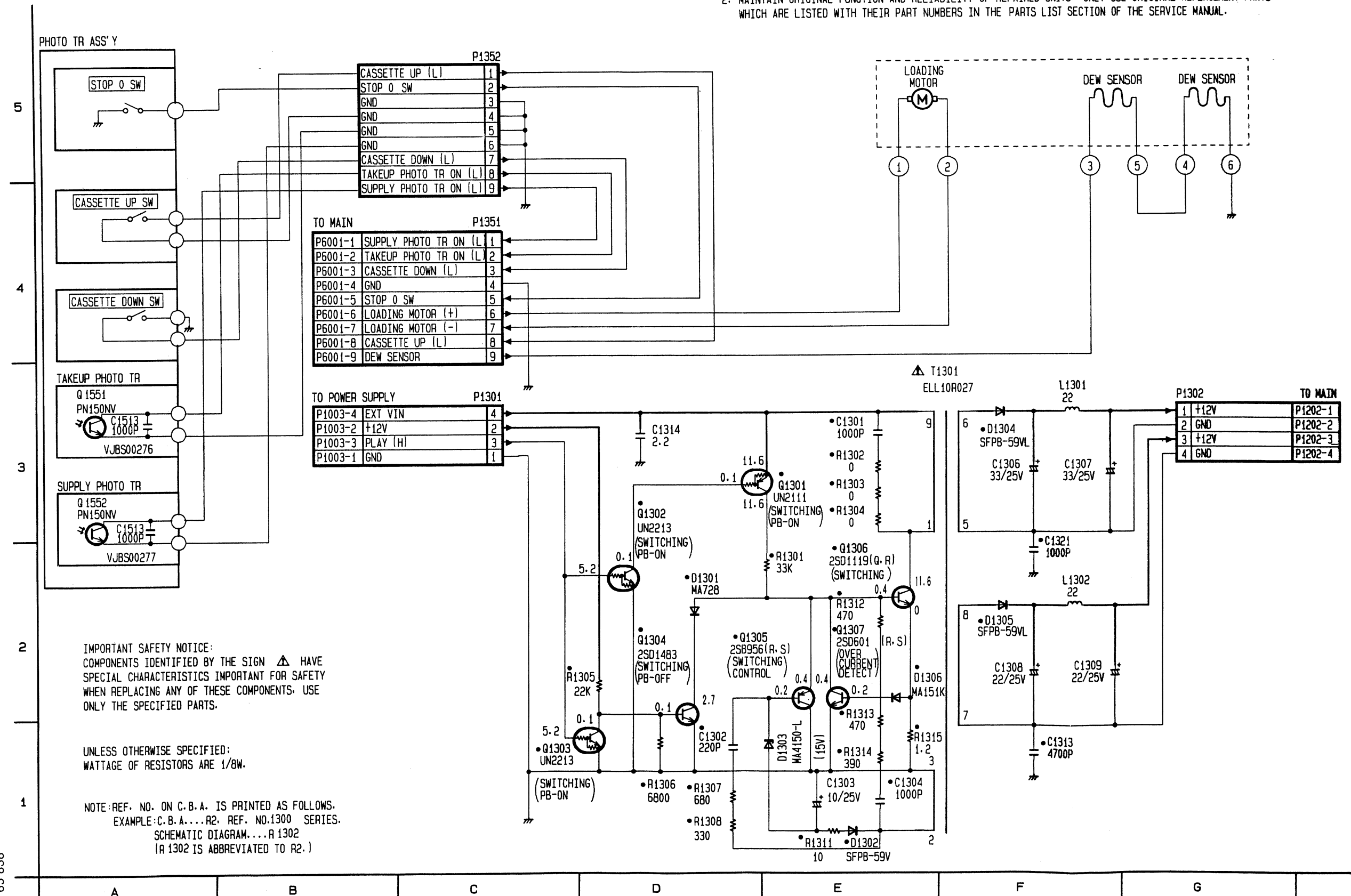
JACK II



6.6 A/V POWER

NOTE:

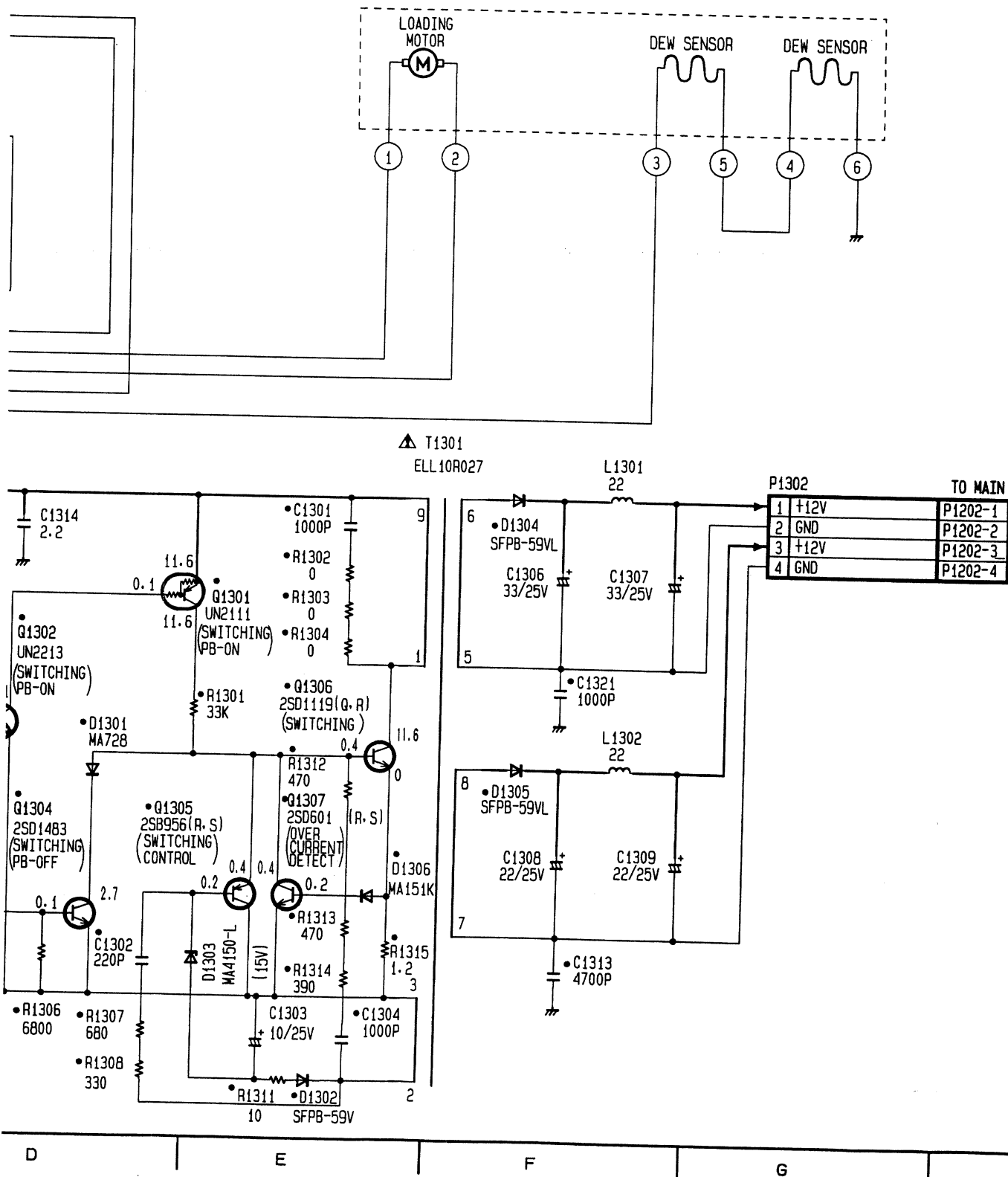
- DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.
- MAINTAIN ORIGINAL FUNCTION AND RELIABILITY OF REPAIRED UNITS. ONLY USE ORIGINAL REPLACEMENT PARTS WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THE SERVICE MANUAL.



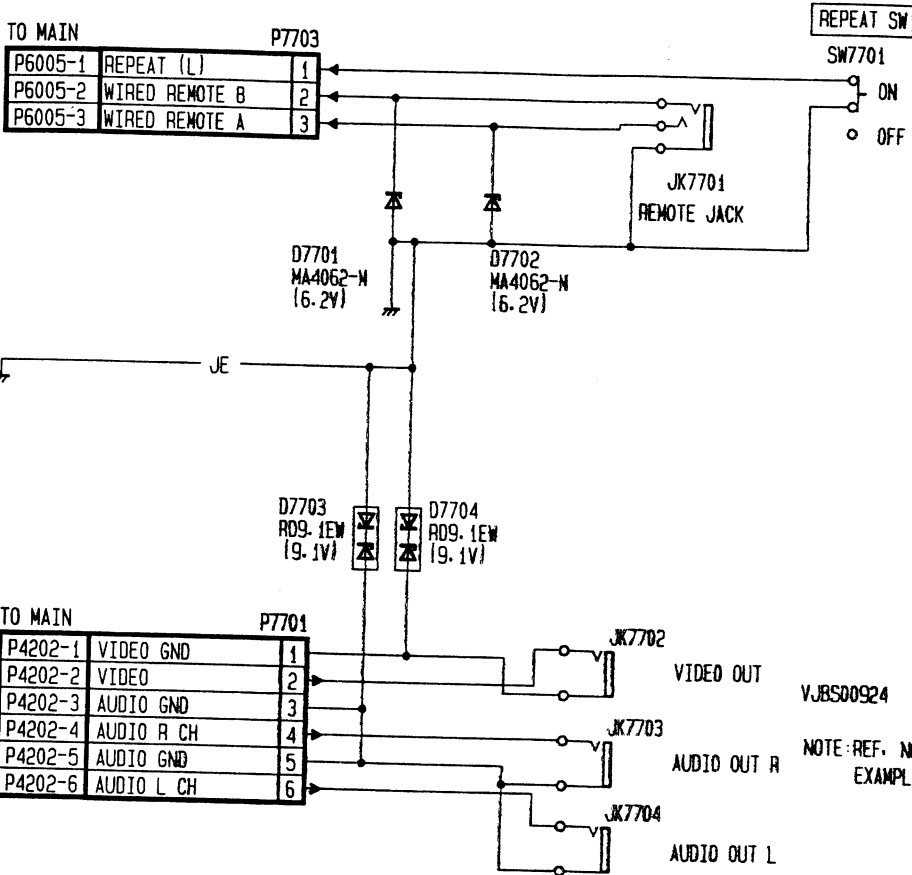
6.7 JACK I, II

NOTE:

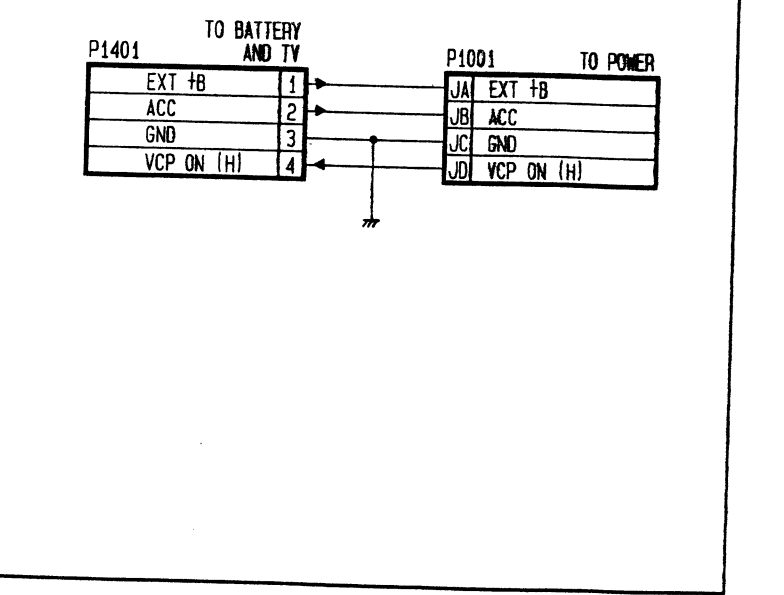
- 1. DO NOT USE THE PART NUMBER SHOWN ON THIS DRAWING FOR ORDERING. THE CORRECT PART NUMBER IS SHOWN IN THE PARTS LIST, AND MAY BE SLIGHTLY DIFFERENT OR AMENDED SINCE THIS DRAWING WAS PREPARED.
- 2. MAINTAIN ORIGINAL FUNCTION AND RELIABILITY OF REPAIRED UNITS. ONLY USE ORIGINAL REPLACEMENT PARTS WHICH ARE LISTED WITH THEIR PART NUMBERS IN THE PARTS LIST SECTION OF THE SERVICE MANUAL.



JACK I

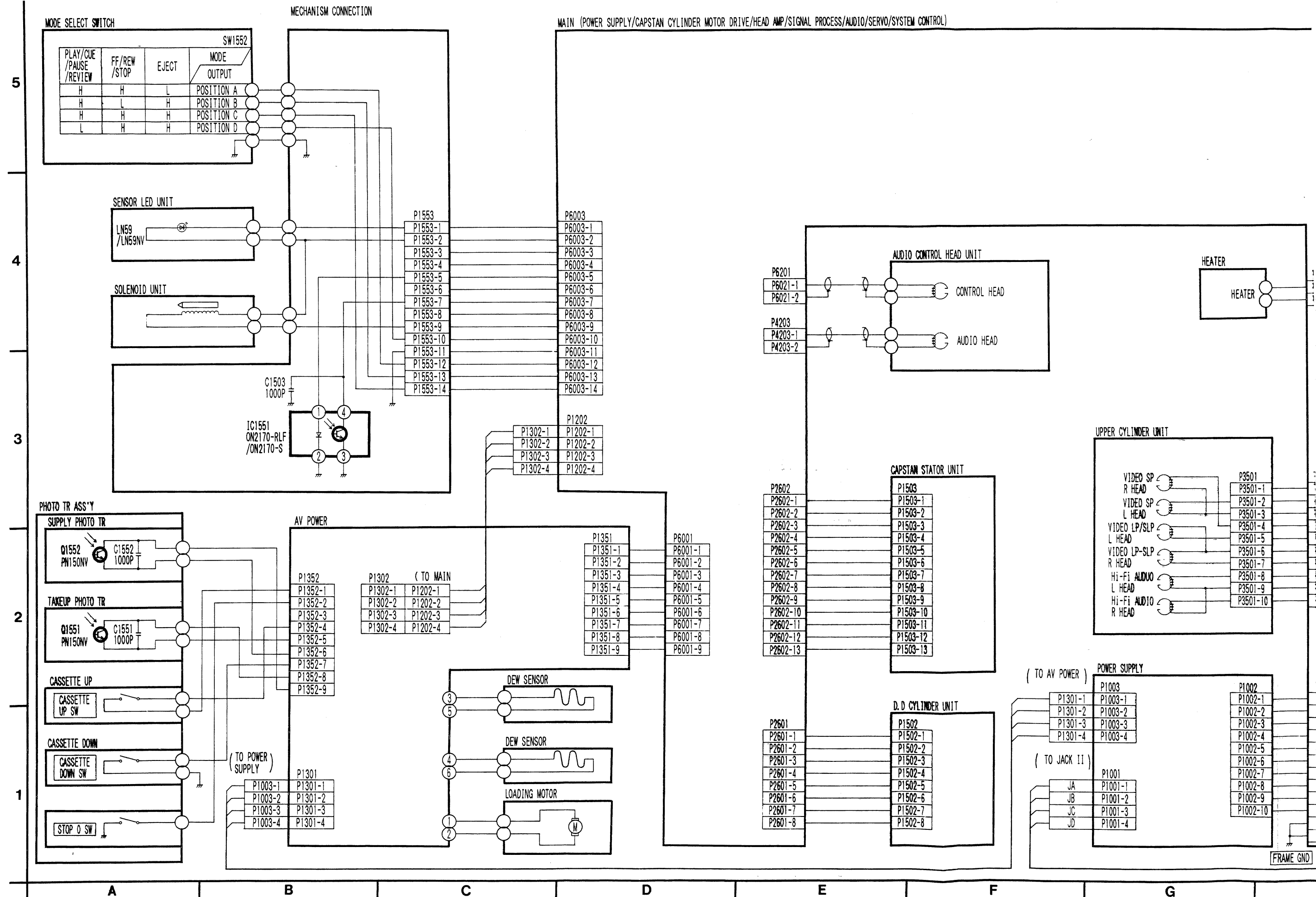


JACK II



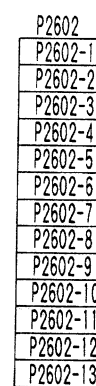
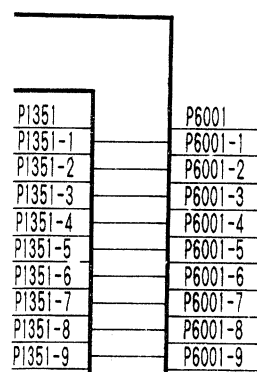
NOTE: REF. NO. ON C.B.A. IS PRINTED AS FOLLOWS.
EXAMPLE: C.B.A....R2. REF. NO. 7700 SERIES.
SCHEMATIC DIAGRAM....R7702
(R7702 IS ABBREVIATED TO R2.)

6.8 INTERCONNECTIONS

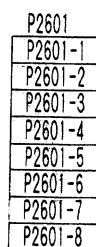
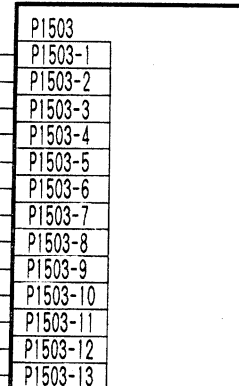


1
2
3
4
5
6
7
8
9
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11
12
13
14

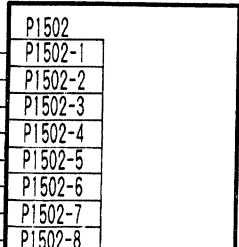
1
2
3
4



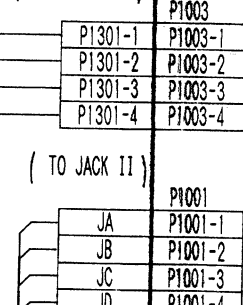
CAPSTAN STATOR UNIT



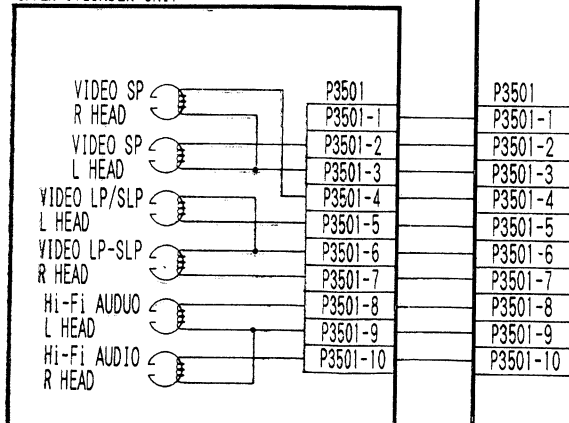
D.D CYLINDER UNIT



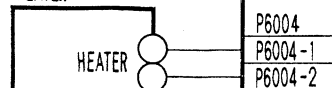
POWER SUPPLY



UPPER CYLINDER UNIT

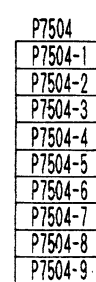
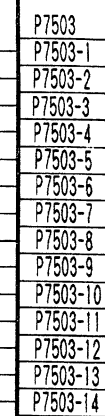
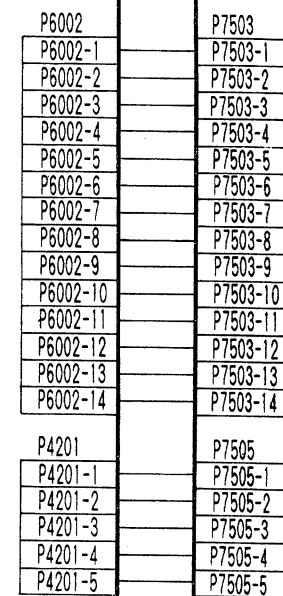


HEATER

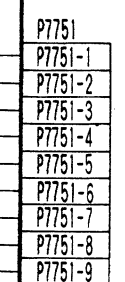


FRAME GND

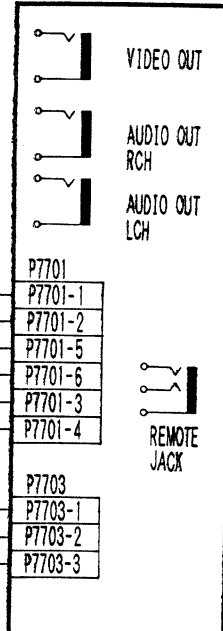
OPERATION I



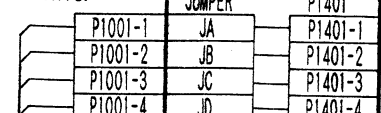
OPERATION II



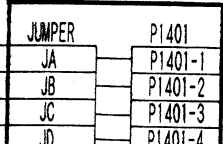
JACK I



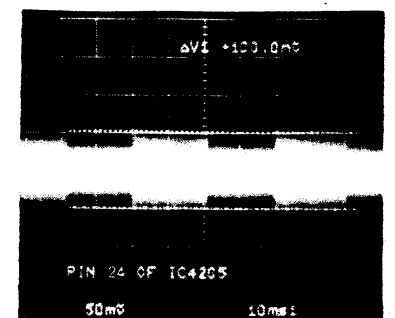
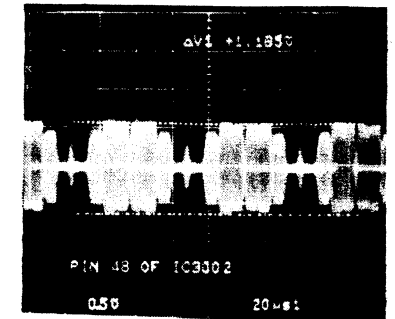
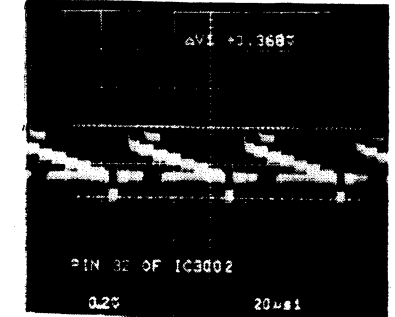
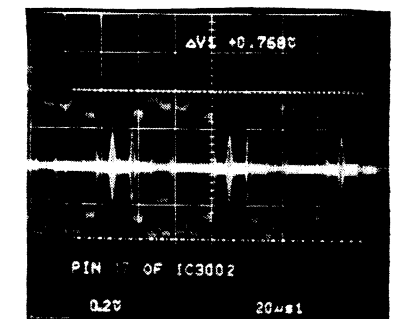
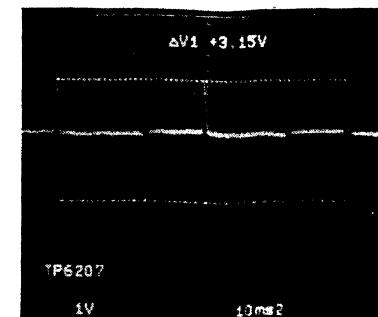
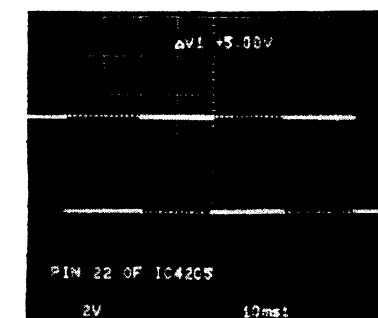
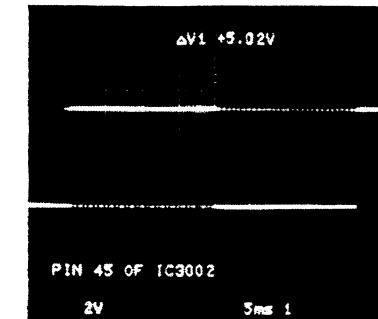
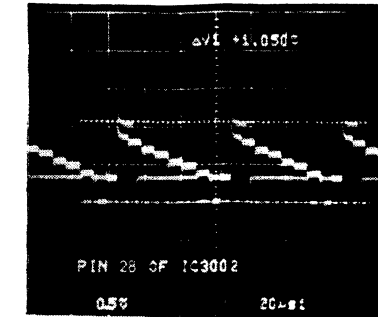
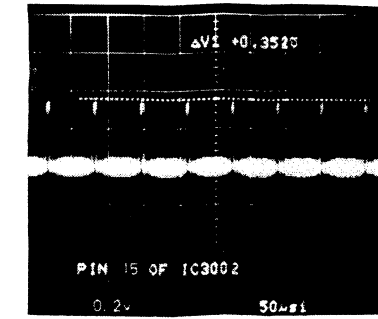
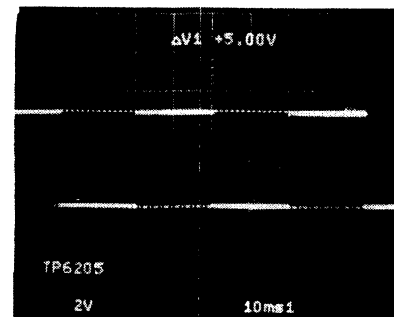
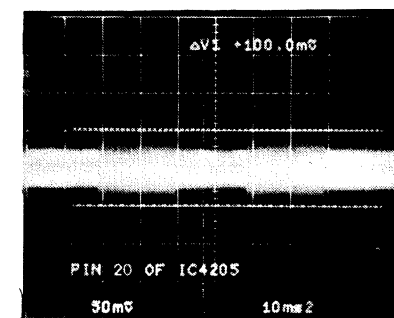
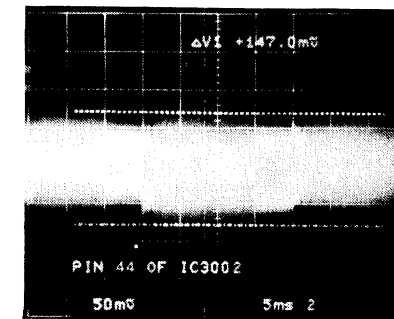
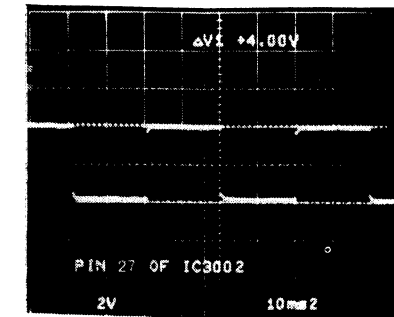
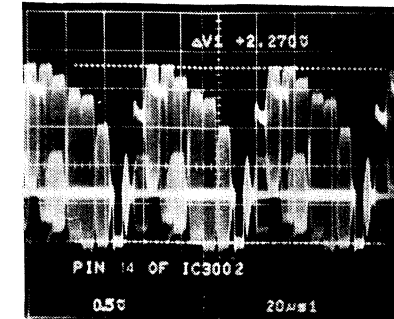
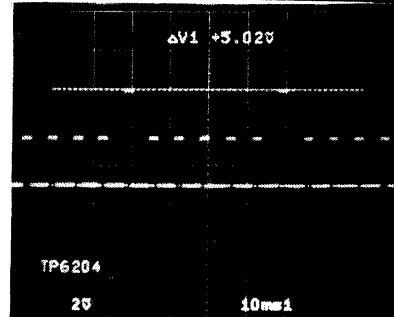
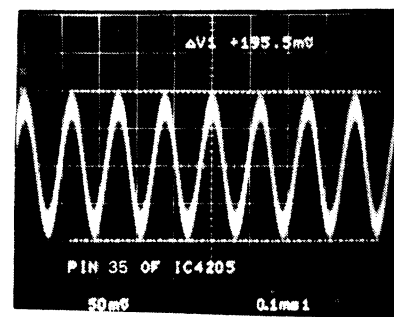
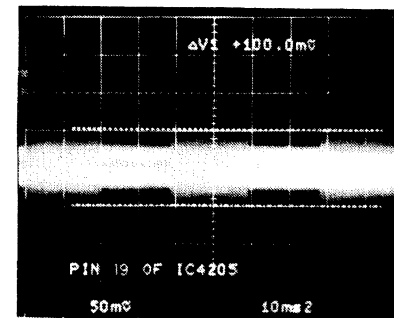
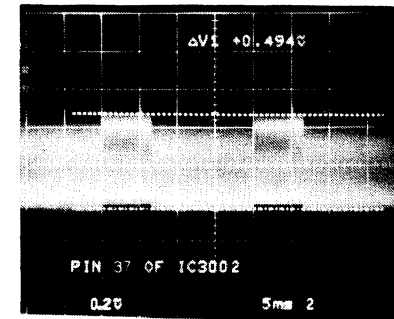
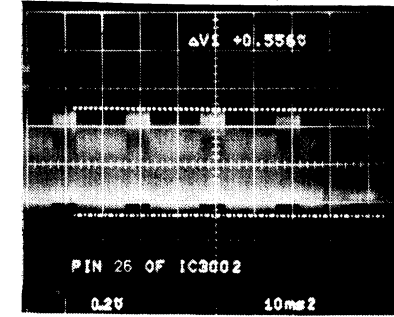
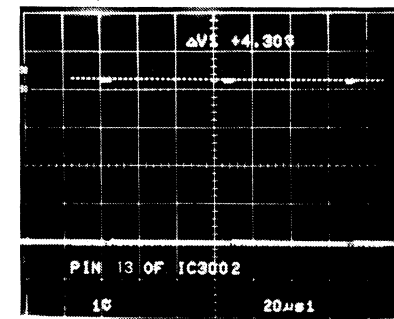
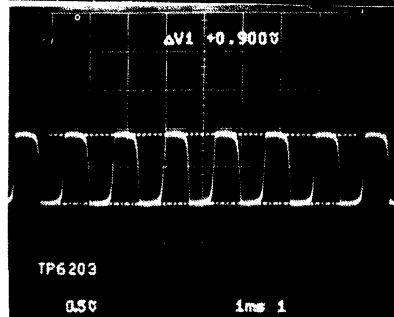
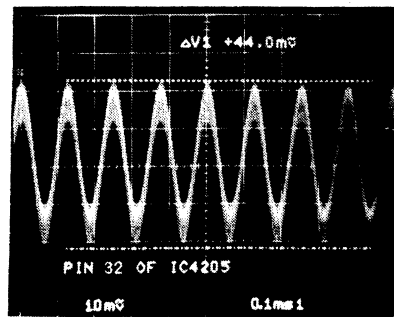
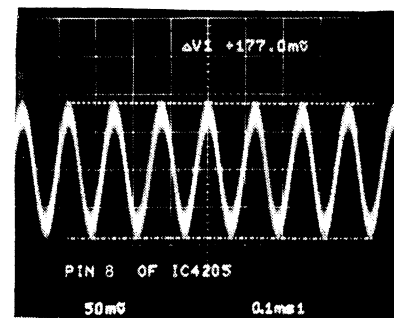
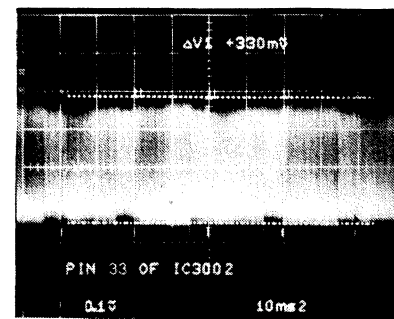
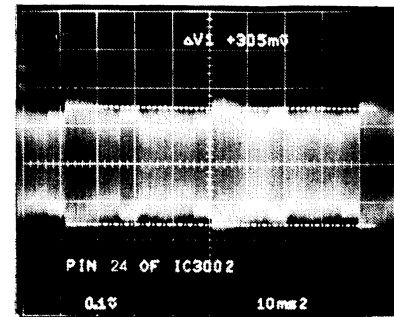
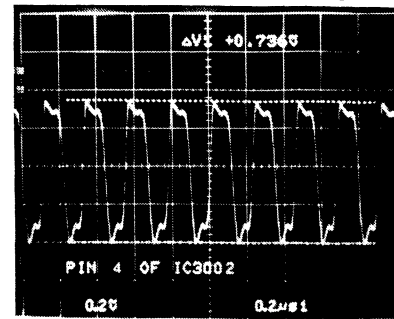
(TO POWER SUPPLY)



JACK II

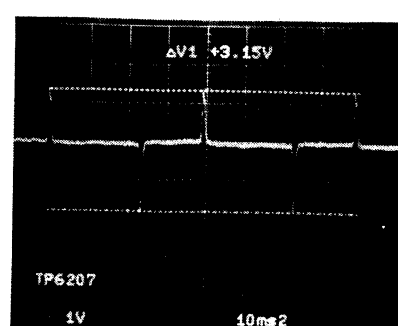
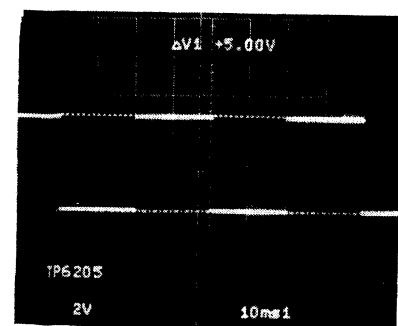
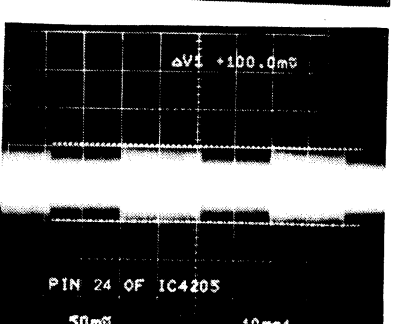
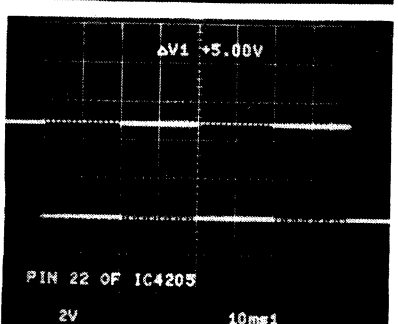
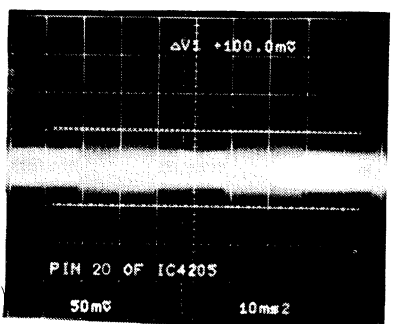
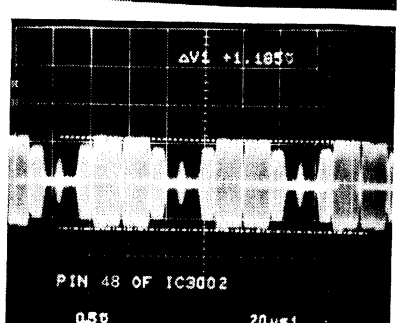
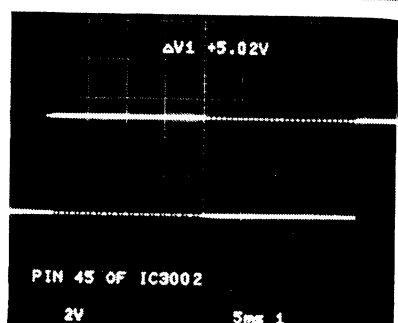
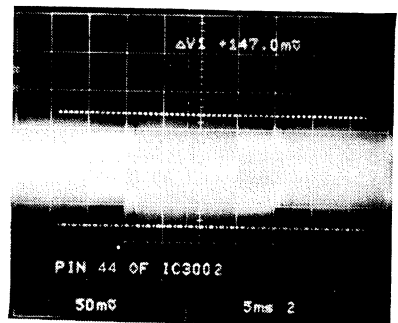
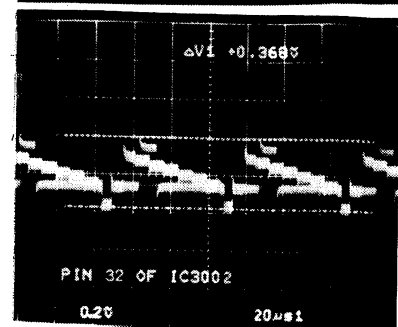
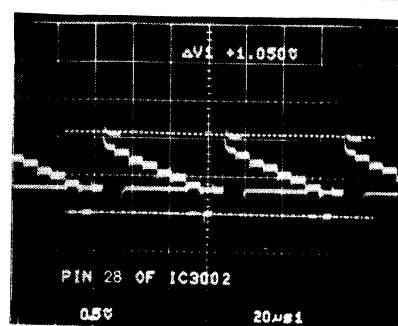
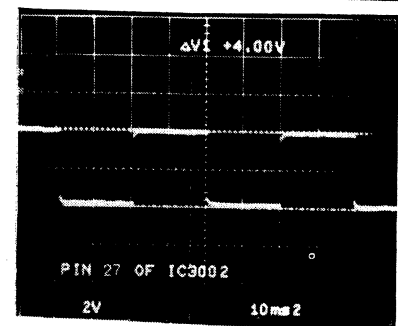
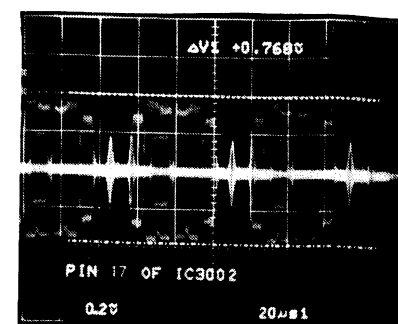
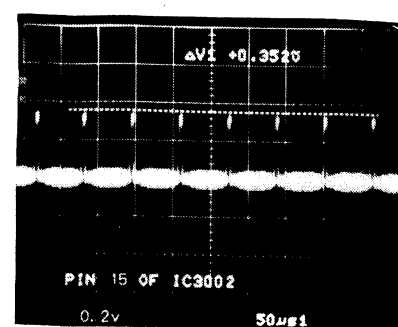
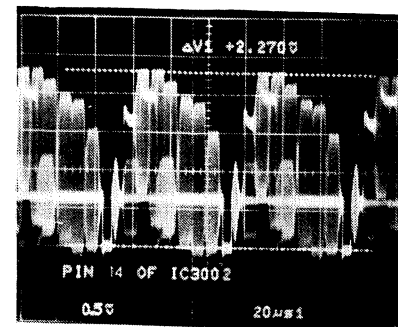


8. OSCILLOGRAMS



VOLTAGE CHART

MAIN I (servo/system control)



MODE	STOP	FF	REW
PIN NO			
IC2601			
1	12.1	12.1	12.1
2	12.1	12.1	12.1
3	0.1	0.1	0.1
4	0	0	0
5	0	0	0
6	2.7	2.7	2.7
7	4.8	4.8	4.8
8	1.4	1.4	1.4
9	1.0	1.0	1.0
10	1.3	1.3	1.3
11	5.2	5.2	5.2
12	4.4	4.4	4.4
13	4.4	4.4	4.4
14	4.0	4.0	4.0
15	5.2	5.2	5.2
16	12.1	12.1	12.1
17	12.1	12.1	12.1
18	0.1	0.1	0.1
IC2602			
1	12.0	12.0	12.0
2	2.8	2.8	2.8
3	12.1	12.1	12.1
4	12.0	12.0	12.0
5	2.8	2.8	2.8
6	12.1	12.1	12.1
7	11.6	11.6	11.6
8	2.8	2.8	2.8
IC2603			
1	2.8	2.8	2.8
2	12.1	12.1	12.1
3	11.6	11.6	11.6
4	12.0	12.0	12.0
5	12.0	12.0	12.0
6	---	---	---
7	0.6	0.6	0.6
8	0	0	0
9	0.2	0.2	0.2
10	0	0	0
11	0.5	0.5	0.5
12	---	---	---
13	3.2	3.2	3.2
14	5.2	5.2	5.2
15	1.2	1.2	1.2
16	2.9	2.9	2.9
17	2.7	2.7	2.7
18	1.7	1.7	1.7
19	1.7	1.7	1.7
20	1.7	1.7	1.7
21	1.7	1.7	1.7
22	1.7	1.7	1.7
23	1.6	1.6	1.6
24	1.6	1.6	1.6
25	---	---	---
26	2.8	2.8	2.8
27	0	0	0
28	2.8	2.8	2.8
IC6001			
1	5.1	5.1	5.1
2	0	0	0
3	5.2	5.2	5.2
4	5.2	5.2	5.2

MODE	STOP	FF	REW
PIN NO			
5	5.1	5.1	5.1
6	5.2	5.2	5.2
7	1.4	2.6	2.6
8	5.2	5.2	5.2
9	5.2	5.2	5.2
10	5.2	5.2	5.2
11	5.2	5.2	5.2
12	0	0	0
13	5.2	5.2	5.2
14	0	0	0
15	0	0	0
16	0	0	0
17	5.0	5.0	5.0
18	4.9	4.9	4.9
19	5.1	5.1	5.1
20	5.2	5.2	5.2
21	0	0	0
22	0.1	0.1	0.1
23	0.2	0.2	0.2
24	2.6	2.6	2.6
25	0	2.6	2.6
26	2.6	2.6	2.6
27	0.1	0.1	0.1
28	2.0	2.0	2.0
29	5.1	0.1	0.1
30	5.1	5.1	5.1
31	1.2	1.2	1.2
32	2.1	2.1	2.1
33	0.1	0.1	0.1
34	0	5.1	5.1
35	5.0	5.0	5.0
36	0	0	0
37	0	0	0
38	3.3	3.3	3.3
39	1.2	2.7	2.7
40	2.6	0.1	5.0
41	5.1	5.1	5.1
42	0	0	0
43	5.2	5.2	5.2
44	2.6	2.6	2.6
45	2.8	0	2.7
46	2.7	2.7	2.7
47	5.2	5.2	5.2
48	0	0	0
49	0	0	0
50	2.7	2.7	2.7
51	2.7	2.7	2.7
52	2.3	3.2	3.2
53	2.8	2.6	2.6
54	5.2	5.2	5.2
55	0	0	0
56	0	0	0
57	0	0	0
58	2.7	2.7	2.7
59	2.7	2.7	2.7
60	0	0	0
61	2.8	3.3	3.3
62	2.7	2.7	2.7
63	5.2	5.2	5.2
64	2.6	2.6	2.6
65	3.9	3.9	3.9
66	3.4	3.4	3.4

MODE	STOP	FF	REW
PIN NO			
67	3.3	3.3	3.3
68	4.8	2.2	2.4
69	5.2	5.2	5.2
70	5.0	5.0	5.0
71	0	0	0
72	0.8	0.8	0.8
73	5.2	5.2	5.2
74	5.2	5.2	5.2
75	5.2	5.2	5.2
76	0	5.2	5.2
77	0	0	0
78	---	---	---
79	---	---	---
80	---	---	---
81	---	---	---
82	5.1	5.1	5.1
83	5.1	5.1	5.1
84	0.1	0.1	0.1
IC6002			
1	5.2	5.2	5.2
2	5.2	5.2	5.2
3	0	0	0
IC6003			
1	0	0	0
2	12.1	12.1	12.1
3	0.6	0.6	0.3
4	---	---	---
5	0	0	0
6	12.1	12.1	12.1
7	0.7	0.7	0.7
8	12.1	12.1	12.1
9	0	0	0
IC6201			
1	0.9	0.9	0.9
2	1.4	1.4	1.4
3	1.4	1.4	1.4
4	0	0	0
5	1.4	2.7	2.7
6	1.4	2.6	2.6
7	1.2	2.6	2.6
8	5.2	5.2	5.2
IC6202			
1	3.5	3.5	3.5
2	5.2	5.2	5.2
3	3.6	3.6	3.6
4	0	0	0
5	3.6	3.6	3.6
6	0.8	0.8	0.8
7	5.2	5.2	5.2
Q6001			
E	5.2	5.2	5.2
C	0	0	0
B	5.2	5.2	5.2
Q6002			
E	0	0	0
C	12.1	12.1	12.1
B	0	0	0

MODE	STOP	FF	REW
PIN NO			
Q6003			
E	0	0	0
C	12.1	12.1	12.1
B	0	0	0
Q6004			
E	0	0	0
C	8.3	5.4	5.4
B	0.3	0.5	0.5
Q6005			
E	0.8	0.8	0.8
C	5.8	5.8	5.8
B	0.8	0.8	0.8
Q6006			
E	0.8	0.8	0.8
C	0.8	0.8	0.8
B	1.4	1.4	1.4
Q6007			
E	0.8	0.8	0.8
C	2.7	2.7	2.7
B	0.5	0.5	0.5
Q6008			
E	0	0	0
C	11.0	11.6	11.6
B	0	0	0
Q6009			
E	5.2	5.2	5.2
C	5.0	5.0	5.0
B	5.2	5.2	5.2
Q6010			
E	0	0	0
C1	0	0	0
C2	3.3	3.3	3.3
B1	2.7	2.7	2.7
B2	2.7	2.7	2.7
Q6011			
E	0	0	0
C	0	0	0
B	3.3	3.3	3.3
Q6201			
E	1.2	2.6	2.6
C	1.2	2.6	2.6
B	0.6	5.1	5.1
Q6203			
E	0	0	0
C	0	0	0
B	5.1	0	0
TP6001	5.2	5.2	5.2
TP6002	5.2	5.2	5.2
TP6003	5.2	5.2	5.2
TP6201	2.6	2.6	2.6
TP6202	2.6	2.6	2.6
TP6203	2.7	2.7	2.7
TP6204	5.2	5.2	5.2
TP6205	5.1	5.1	5.1
TP6207	2.7	2.7	2.7
TP6208	1.4	1.4	1.4

9. LAY OUT OF ICs AND TRs

GENERAL

MN675201V1Y,
UPD75304GF-136

AN1358S, UPC358G2
LA7280M, AN3334S
MN3811S, M5280FP

VCRS0166, VCRS0165

AN3826NK,
AN3316SB

2SB644, 2SB1050
2SD636, 2SD1458,
2SC2021M, 2SD1330
2SB793, 2SB643,
2SB1050

2SD601, 2SB709,
2SB710, 2SC2412KS,
2SA1037KR, 2SA1037KS,
2SC2404, 2SD1483,
2SB710A, 2SB1073
2SD874, 2SD874A
2SB766A

2SB956
2SD1119

AN1393S

UN2210 (R1=47K, R2=OPEN)
DTC114EK (R1=10K, R2=10K)
UN2211 (R1=10, R2=10K)
UN2212 (R1=22K, R2=22K)
UN2213 (R1=47K, R2=47K)
UN2215 (R1=10K, R2=OPEN)
DTC124EK (R1=10K, R2=OPEN)
UN221L (R1=4.7K, R2=4.7K)

UN2111 (R=47K, R2=47K),
UN2115 (R=47K, R2=47K),
DTA114EK (R1=47K, R2=47K),
DTA114TK (R1=10K, R2=OPEN),
DTC143EK (R1=4.7K, R2=4.7K)

MN1280-R

MAIN PANEL

AN3813K

TA7291S

ON3401-R

AN78L05M
UPC78L05T-E1

PUA3228

LP2950CZ

2SA1618
XN1501
FMW1

2SD947

MECHANISM CONNECTION

ON2170-RLF
ON2170-S

POWER SUPPLY

2SC3852,
2SB953a

2SK1190

HOW TO READ THE IDENTIFICATION MARK OF CHIP TRANSISTOR IN THIS UNIT.

MARKING	PART NO.	MARKING	PART NO.
A	2SB709	04	DTC114TK
BR	2SC2412R	5R	XN1501
BS	2SC2412S	6A	UN2111
D	2SB710A	6E	UN2115
FR	2SA1037R	8A	UN2211
FS	2SA1037S	8B	UN2212
H	2SB956	8C	UN2213
I	2SB1073	8E	UN2215
SY	2SA1618	8Q	UN221L
T	2SD1119	14	DTA114EK
U	2SC2404	23	DTC143EK
W1	FMW1	24	DTC114EK
Y	2SD601	25	DTC124EK
Z	2SD874	94	DTA114TK

HOW TO READ THE IDENTIFICATION MARK OF CHIP DIODES IN THIS UNIT.

MARKING	PART NO.
MC	MA153
MH	MA151K
MA	MA151WK
1A	MA110
2A	MA728

2SB644, 2SB1050
2SD636, 2SD1458,
2SC2021M, 2SD1330
2SB793, 2SB643,
2SB1050

2SD601, 2SB709,
2SB710, 2SC2412KS,
2SA1037KR, 2SA1037KS,
2SC2404, 2SD1483,
2SB710A, 2SB1073
2SD874, 2SD874A
2SB766A

UN2111 (R=47K, R2=47K),
UN2115 (R=47K, R2=47K),
DTA114EK (R1=47K, R2=47K),
DTA114TK (R1=10K, R2=OPEN),
DTC143EK (R1=4.7K, R2=4.7K)

MN1280-R

PUA3228

LP2950CZ

CONNECTION

ON2170-RLF
ON2170-S

POWER SUPPLY

2SC3852,
2SB953a

2SK1190

HOW TO READ THE IDENTIFICATION MARK OF CHIP TRANSISTOR IN THIS UNIT.

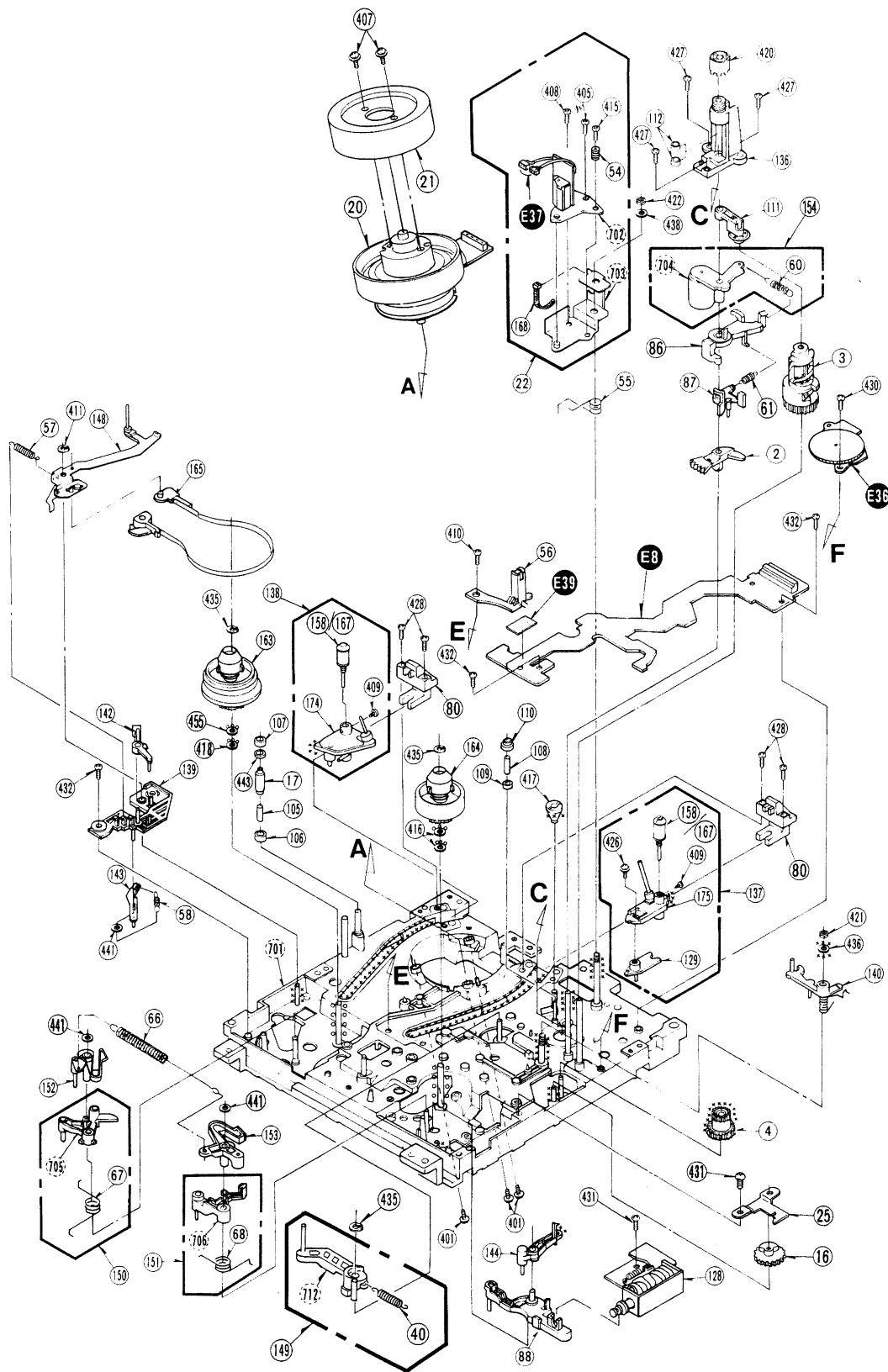
MARKING	PART NO.	MARKING	PART NO.
A	2SB709	04	DTC114TK
BR	2SC2412R	5R	XN1501
BS	2SC2412S	6A	UN2111
D	2SB710A	6E	UN2115
FR	2SA1037R	8A	UN2211
FS	2SA1037S	8B	UN2212
H	2SB956	8C	UN2213
I	2SB1073	8E	UN2215
SY	2SA1618	8Q	UN221L
T	2SD1119	14	DTA114EK
U	2SC2404	23	DTC143EK
W1	FMW1	24	DTC114EK
Y	2SD601	25	DTC124EK
Z	2SD874	94	DTA114TK

HOW TO READ THE IDENTIFICATION MARK OF CHIP DIODES IN THIS UNIT.

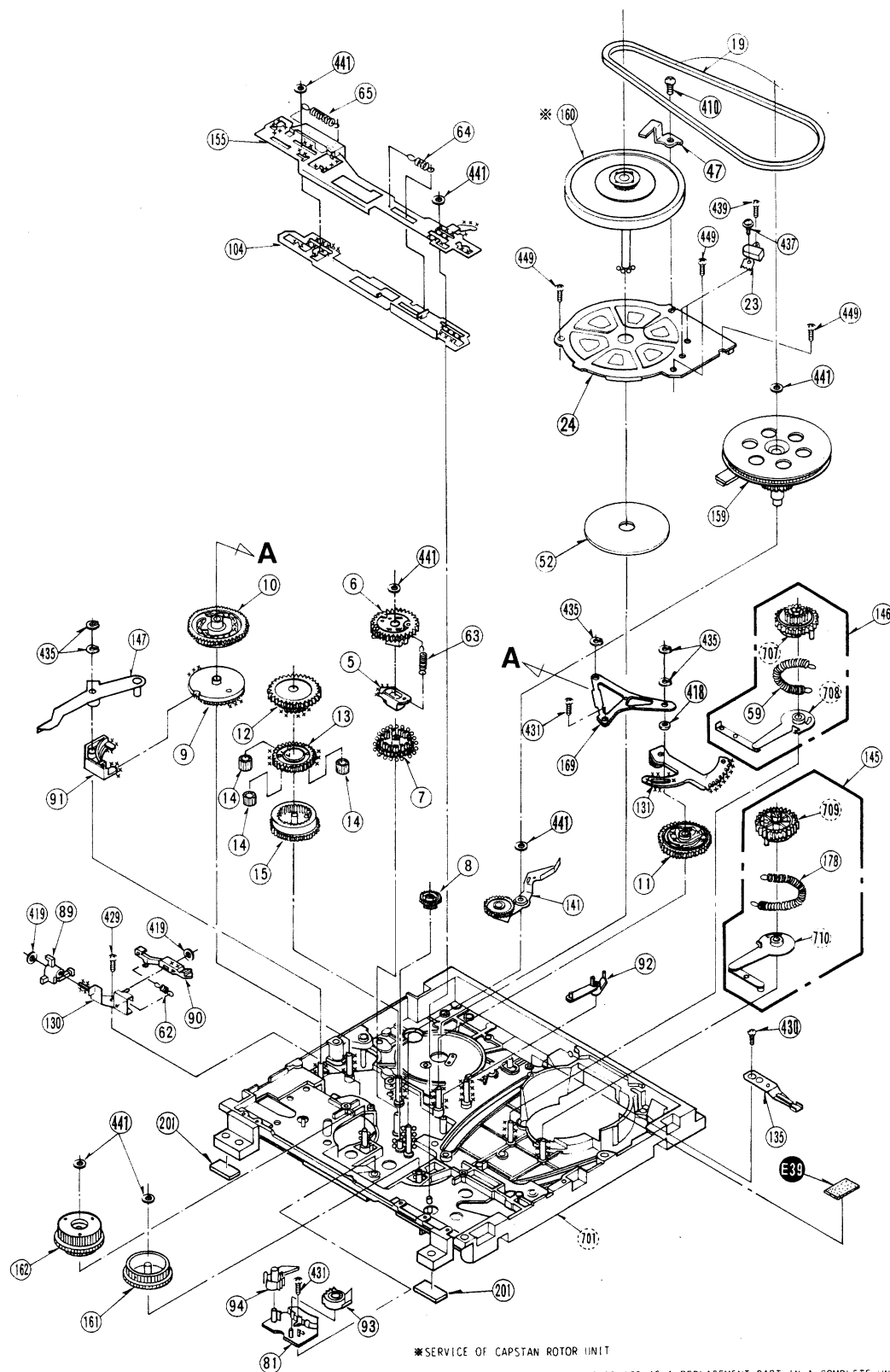
MARKING	PART NO.
MC	MA153
MH	MA151K
MA	MA151WK
1A	MA110
2A	MA728

10. EXPLODED VIEWS

10.1 TRANSPORT



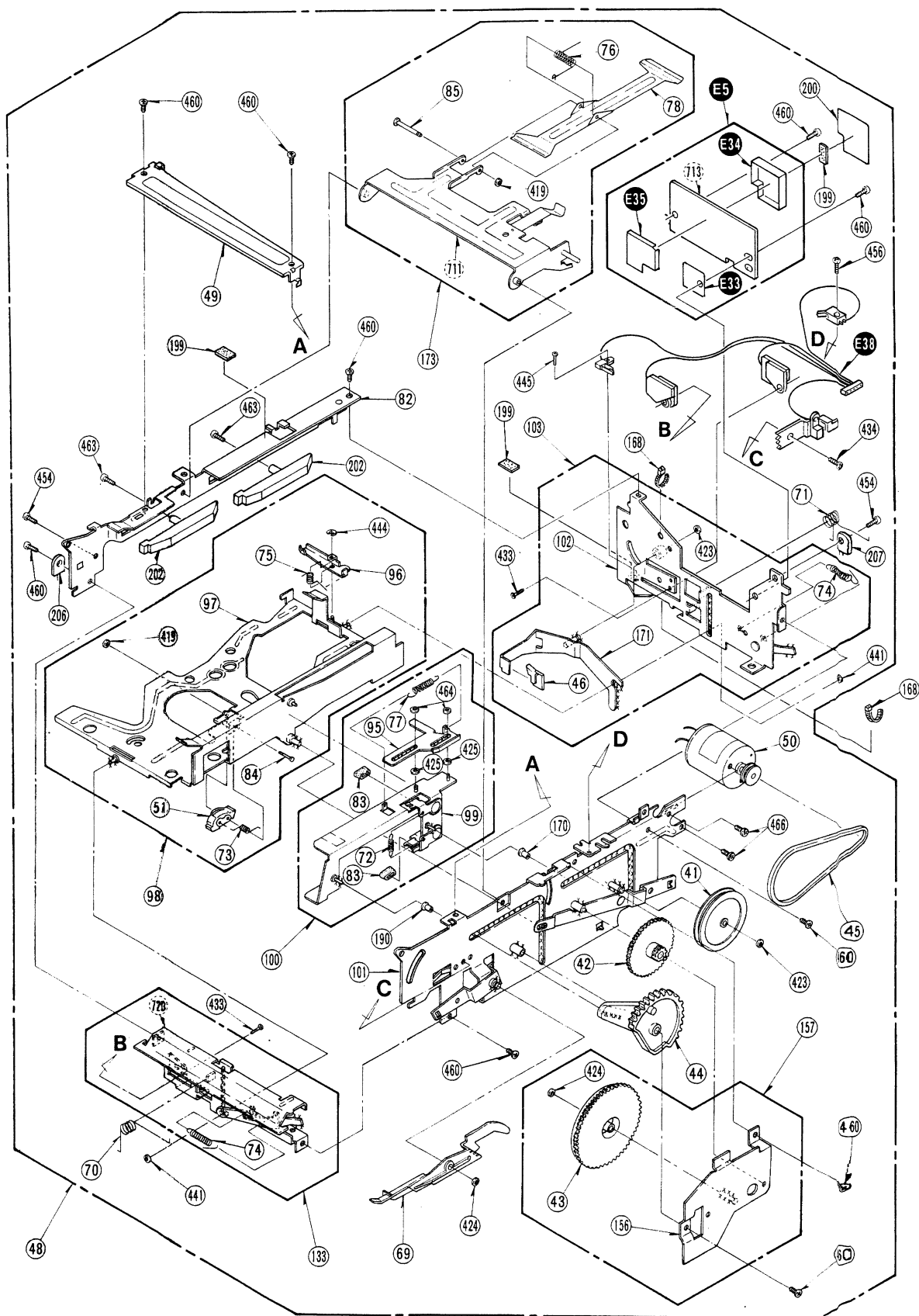
10.2 MOVING MECHANISM



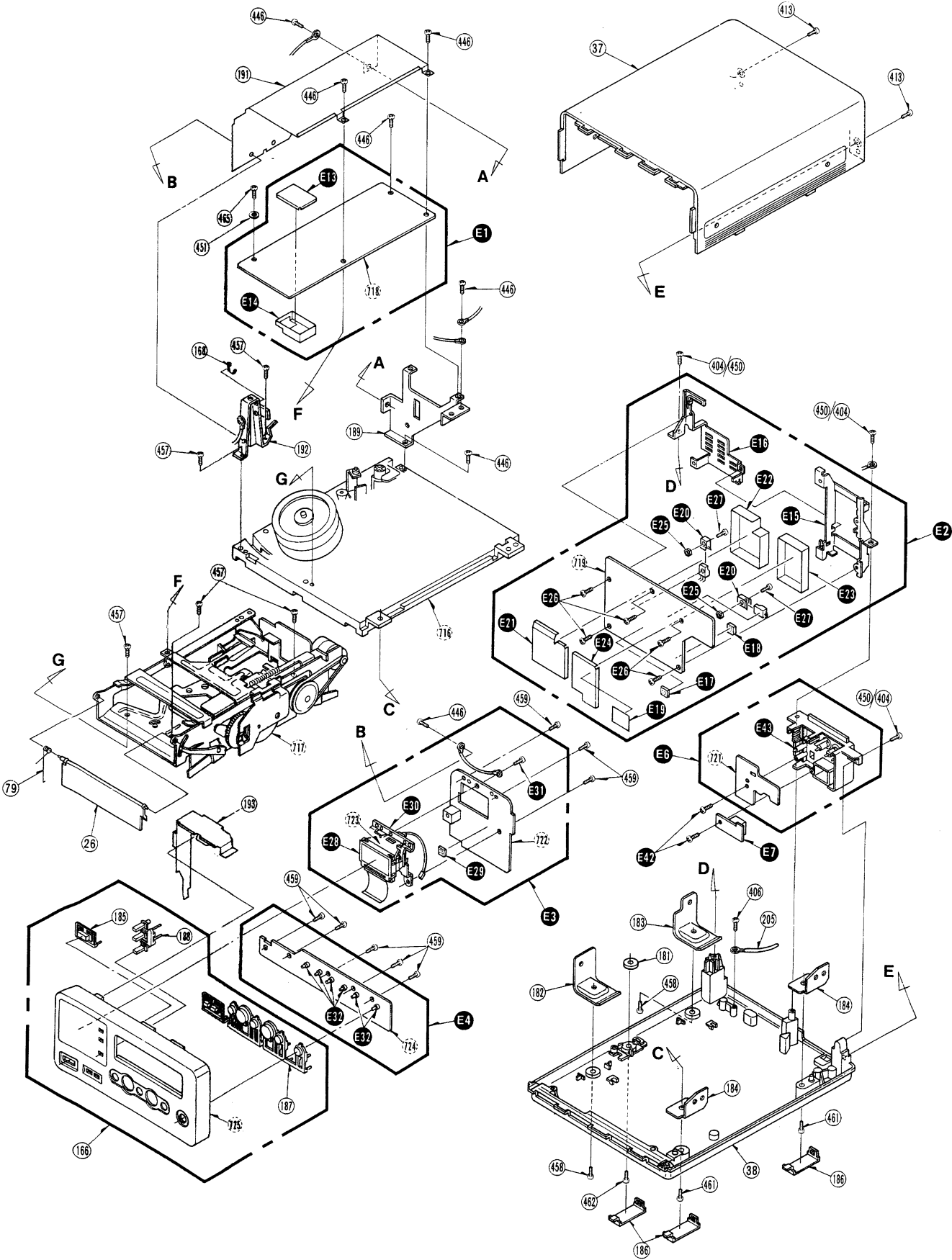
*SERVICE OF CAPSTAN ROTOR UNIT

THE CAPSTAN ROTOR UNIT IS SUPPLIED AS A REPLACEMENT PART IN A COMPLETE UNIT WITH A SPRING LOADED CAPSTAN PULLEY. DO NOT REMOVE THE RETAINING RING ON THE CAPSTAN PULLEY OF THE CAPSTAN ROTOR UNIT.

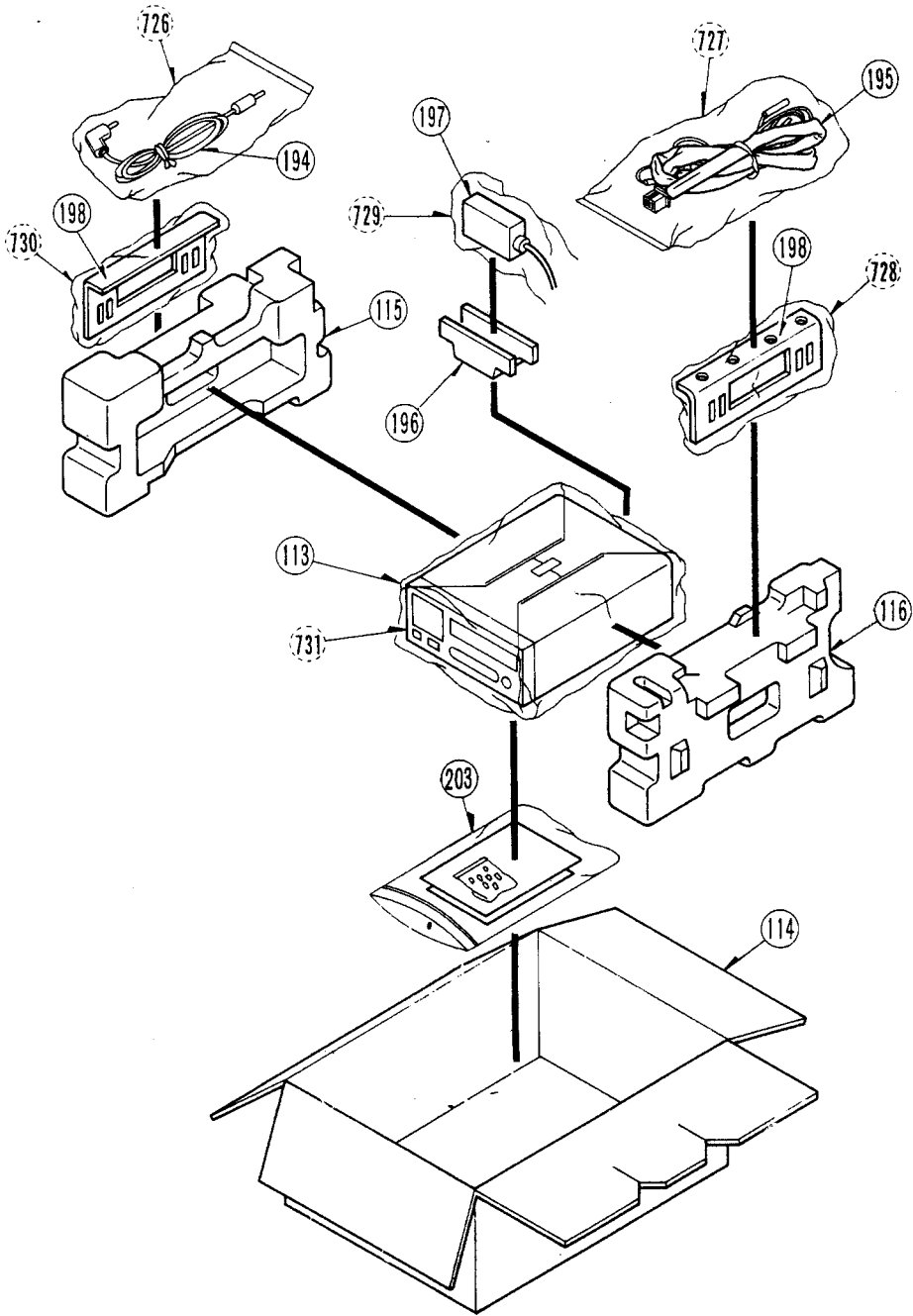
10.3 CASSETTE UP MECHANISM



10.4 CHASSIS FRAME & CASING PARTS



10.5 ACCESSORIES SECTION



11. LUBRIFICATION

When the parts marked in the exploded views are replaced, apply the recommended lubricants or adhesive.

MARKS	LUBRICANT	AVAILABILITY	CODE NUMBER
XXX	MOLYKOTE DX	AVAILABLE FROM PCS	4822 390 20017
OOO	BP SVS 20W50	AVAILABLE FROM PCS	4822 390 10069
▲▲▲	GUMMED ADH.	PURCHASE LOCALLY	

12.1 LIST OF MECHANICAL PARTS

Only those parts of which the item number is stated below, are considered service parts.

(.) Refers to the number of the exploded view

2 (1)	4822 522 33206 P5 sector gear	80 (1)	4822 462 71817 Post stopper	188 (4)	4822 410 61729 Reset button
3 (1)	4822 528 81466 Press. roller lift cam	83 (3)	4822 404 21197 Holder belt	190 (3)	4822 528 70777 Guide roller -B
4 (1)	4822 522 33195 Press. reduction gear	88 (1)	4822 404 21221 Solenoid lever	194 (5)	4822 321 61481 AV cable
5 (2)	4822 404 21196 Lock slide gear	89 (2)	4822 404 21222 Change lever	195 (5)	4822 321 10798 Supply cable
6 (2)	4822 522 33196 Clutch gear	90 (2)	4822 404 21203 Release lever	197 (5)	4822 218 10442 Remote control unit
7 (2)	4822 522 33197 Drive gear	93 (2)	4822 522 33221 Release lever -L	202 (3)	4822 466 93076 Guide
8 (2)	4822 522 33207 Intermediate gear	94 (2)	4822 522 33219 Release lever -R	203 (5)	4822 310 31971 Mounting material
9 (2)	4822 522 33198 Sub cam gear	98 (3)	4822 256 91858 Main holder unit	401 (1)	4822 502 13933 Screw with washer
10 (2)	4822 522 33199 Main cam gear	99 (3)	4822 256 91859 Sub holder	407 (1)	4822 502 13934 Screw with washer
11 (2)	4822 522 33201 Loading cam gear	105 (1)	4822 532 61211 Collar	409 (1)	4822 502 13935 Lock screw
12 (2)	4822 522 33213 Sun gear	106 (1)	4822 532 12146 Supply limiter	416 (1)	4822 532 12149 Washer
13 (2)	4822 522 33202 Reatiner gear	107 (1)	4822 532 52411 Supply upper limiter	417 (1)	4822 505 11122 Adjust nut
14 (2)	4822 522 33203 Planetary gear	108 (1)	4822 532 61212 P4 sleeve	418 (1-2)	4822 532 52424 Poly washer 3
15 (2)	4822 522 33204 Ring gear	109 (1)	4822 532 52414 P4 limiter	419 (3)	4822 532 52417 Cut washer 1.5X0.4
16 (1)	4822 522 33208 Switch cam gear	110 (1)	4822 532 52413 P4 upper limiter	420 (1)	4822 505 11123 Thrust screw unit
17 (1)	4822 528 70776 Supply roller	111 (1)	4822 404 21201 Pressuer cam cap	423 (2)	4822 532 52416 Cut washer
19 (2)	4822 358 31171 Capstan belt	112 (1)	4822 532 52412 Dust seal	424 (3)	4822 532 52418 Cut washer
20 (1)	4822 404 21198 D.D. cylinder unit	128 (1)	4822 281 50167 Solenoid unit	425 (3)	4822 532 52423 Poly washer 2.5
21 (1)	4822 691 20731 Upper cylinder unit	130 (2)	4822 404 21202 Release lever unit	426 (1)	4822 502 13938 Screw
22 (1)	4822 249 10454 A/C head unit	131 (2)	4822 522 33214 Sector gear unit	435 (1-2)	5322 530 74076 Ret.ring C 3
23 (2)	4822 214 33566 FG head	136 (1)	4822 256 91875 Capstan holder unit	436 (1)	4822 532 52422 Poly washer 3
24 (2)	4822 362 10268 Capstan stator unit	140 (1)	4822 404 21213 P5 arm unit	437 (2)	4822 502 13937 Screw with washer
26 (4)	4822 443 63561 Cassette flap	141 (2)	4822 404 21228 Play arm unit	438 (1)	4822 532 52428 Poly washer 4
37 (4)	4822 423 41167 Top cover	142 (1)	4822 404 21225 Tension rel. arm -A	439 (2)	4822 502 13936 Screw
38 (4)	4822 423 41168 Bottom cover	143 (1)	4822 404 21226 Tension rel. arm -B	441 (1-3)	4822 532 52427 Cut washer
41 (3)	4822 528 50329 Gear pulley	144 (1)	4822 404 21227 Kick rod unit	443 (1)	4822 532 52421 Washer
42 (3)	4822 522 33209 Intermediate gear	145 (2)	4822 404 21229 Loading arm S unit	455 (1)	4822 532 52425 Poly washer 3
43 (3)	4822 522 33211 Cam gear	146 (2)	4822 404 21211 Loading arm T unit	456 (3)	4822 502 13942 Tap screw M1.6X6
44 (3)	4822 522 33212 Wiper arm	147 (2)	4822 404 21204 Cam follower arm	460 (3)	4822 502 11982 Screw + washer 2.6X4
45 (3)	4822 358 31172 Loading belt	148 (1)	4822 404 21205 Tension arm unit	461 (4)	4822 502 13941 Screw
47 (2)	4822 404 21199 Capstan stator stop	149 (1)	4822 404 21217 Sub loading arm unit	462 (4)	4822 502 13939 Screw
50 (3)	4822 361 30384 Loading motor unit	150 (1)	4822 404 21206 Soft brake S unit	464 (3)	4822 532 52419 Cut washer
51 (3)	4822 404 21223 Checker	151 (1)	4822 404 21212 Soft brake T unit	E1 (4)	4822 214 33572 Main panel
54 (1)	4822 492 52296 Adjust spring	152 (1)	4822 404 21207 Main brake S unit	E2 (4)	4822 214 33571 Power supply panel
55 (1)	4822 492 42584 A/C height spring	153 (1)	4822 404 21208 Main brake T unit	E3 (4)	4822 214 33574 Operation 1 panel
56 (1)	4822 255 41252 LED holder	154 (1)	4822 404 21209 Press.roller arm -2	E4 (4)	4822 214 33573 Operation 2 panel
57 (1)	4822 492 33332 Tension spring	155 (2)	4822 404 21214 Main lever unit	E5 (3)	4822 214 33568 AV power panel
58 (1)	4822 492 33324 Tension spring arm	157 (3)	4822 464 50891 Sub frame unit	E6 (4)	4822 214 33567 Jack 1 panel
60 (1)	4822 492 33329 Press. roller spring	158 (1)	4822 528 70778 Roller post unit	E7 (4)	4822 214 33569 Jack 2 panel
61 (1)	4822 492 33325 Pr.roller arm spring	159 (2)	4822 528 50331 Center pulley unit	E8 (1,4)	4822 466 10617 Mechanism conn.
62 (3)	4822 492 33326 Release spring	160 (2)	4822 362 20236 Capstan rotor unit		
63 (3)	4822 492 33327 Clutch gear spring	161 (2)	4822 522 33205 Supply reel gear		
64 (3)	4822 492 33328 Main lever spring	162 (2)	4822 522 33215 Take up reel clutch		
65 (3)	4822 492 33331 Arm brake spring	163 (1)	4822 528 10839 Supply reel table		
66 (1)	4822 492 90185 Main brake spring	164 (1)	4822 528 10841 Take up reel table		
69 (3)	4822 404 21224 Panel opener	165 (1)	4822 401 11433 Tension band unit		
70 (3)	4822 492 42585 Holder spring -F	166 (4)	4822 423 41169 Ornamental plate		
71 (3)	4822 492 42586 Holder spring -R	167 (1)	4822 528 70779 Roller post unit		
72 (3)	4822 492 33333 Holder arm spring	170 (3)	4822 528 70781 Holder guide roller -A		
73 (3)	4822 492 42587 Spring	171 (3)	4822 691 20732 Cassette opener unit		
74 (3)	4822 492 33334 Down lever spring				
75 (3)	4822 492 42588 Lock arm spring	173 (3)	4822 256 91861 Cassette holder		
76 (3)	4822 492 42589 Holder spring	181 (4)	4822 532 52409 Rubber spacer		
77 (3)	4822 492 33335 Catch plate spring	185 (4)	4822 410 61731 Power button		
79 (4)	4822 492 42591 Cassette flap spring	186 (4)	4822 443 63559 Screw cover		
		187 (4)	4822 410 61728 Operation button		

12.2 LIST OF ELECTRICAL PARTS

-II-	-II-	-II-	-II-	-II-	-II-
C1004 4822 124 80222 220µF 35V C1005 4822 124 80222 220µF 35V C1006 4822 126 12238 100nF 25V C1007 4822 126 12238 100nF 25V C1008 4822 126 12253 1000nF 16V C1009 5322 122 34123 1nF 50V C1010 5322 122 34098 10nF 10% 50V C1011 4822 126 12238 100nF 25V C1012 4822 126 12253 1000nF 16V C1013 5322 126 10733 680pF 5% 50V C1014 4822 126 12256 470nF 16V C1015 4822 126 12246 470pF 10% 50V C1016 5322 122 34123 1nF 10% 50V C1017 5322 122 34098 10nF 10% 50V C1018 4822 122 33496 100nF 10% 25V C1019 4822 122 31797 22nF 10% 25V C1020 5322 122 32661 56pF 5% 50V C1021 4822 124 80216 100µF 6.3V C1022 4822 124 21564 100µF 10V C1025 5322 122 34098 10nF 10% 50V C1026 5322 122 34098 10nF 10% 50V C1027 4822 124 80217 220µF 16V C1028 4822 124 80218 270µF 16V C1029 4822 124 80218 270µF 16V C1031 5322 122 34098 10nF 10% 50V C1032 4822 124 80222 220µF 35V C1033 4822 124 40836 4.7µF 25V C1036 4822 124 23903 100µF 25V C1037 4822 126 12245 220pF 10% 50V C1038 5322 122 34123 1nF 10% 50V C1039 4822 126 12255 1nF 10% 50V C1041 4822 126 12252 2200nF 50V C1042 4822 126 12252 2200nF 50V C1201 4822 124 80079 10µF 16V C1202 4822 124 80083 1µF 50V C1203 4822 124 80083 1µF 50V C1204 4822 126 12238 100nF 25V C1301 5322 122 34123 1nF 10% 50V C1302 4822 126 12245 220pF 10% 50V C1303 4822 124 11297 10µF 25V tantal C1304 5322 122 34123 1nF 10% 50V C1306 4822 124 80221 33µF 25V C1307 4822 124 80221 33µF 25V C1308 4822 124 80219 22µF 25V C1309 4822 124 80219 22µF 25V C1313 5322 126 10223 4.7nF 10% 50V C1314 4822 126 12252 22000nF 25V C1321 5322 122 34123 1nF 10% 50V C2601 4822 124 23366 4.7µF 25V C2602 4822 124 23366 4.7µF 25V C2603 4822 124 80082 4.7µF 25V C2604 4822 124 23593 47µF 16V C2605 4822 122 33496 100nF 20% 16V C2606 4822 122 33496 100nF 16V C2607 4822 126 12244 10nF 50V C2608 4822 126 12244 10nF 50V C2609 4822 122 32183 56nF 10% 25V C2610 4822 124 80083 1µF 50V C2611 4822 122 33496 100nF 16V C2612 4822 122 33496 100nF 16V C2613 4822 122 33496 100nF 16V C2614 4822 126 12244 10nF 50V C2615 5322 122 32654 22nF 10% 25V C2616 4822 124 80079 10µF 16V C2617 4822 124 80081 10µF 16V C2618 4822 126 12244 10nF 50V C2619 4822 126 12238 100nF 25V C2620 4822 124 80079 10µF 16V C2621 5322 122 31865 1.5nF 10% 50V C2622 4822 124 80074 22µF 6.3V	C2623 4822 122 33496 100nF 16V C3001 4822 124 23593 47µF 16V C3002 4822 124 80078 33µF 10V C3003 4822 124 80077 22µF 6.3V C3004 4822 126 12244 10nF 50V C3005 5322 122 32965 18pF 5% 50V C3006 5322 122 32965 18pF 5% 50V C3007 4822 126 10326 180pF 5% 50V C3008 4822 122 33514 68pF 5% 50V C3009 4822 126 12238 100nF 25V C3010 5322 122 32661 56pF 5% 50V C3011 4822 126 12238 100nF 25V C3012 4822 126 12244 10nF 50V C3013 4822 126 12282 100nF 25V C3014 5322 126 10223 4.7nF 10% 50V C3015 4822 126 12247 47nF 50V C3016 4822 124 41004 220µF 6.3V C3017 4822 126 12244 10nF 50V C3018 4822 124 80076 47µF 6.3V C3019 4822 126 12253 1000nF 16V C3020 4822 126 12238 100nF 25V C3021 4822 126 12238 100nF 25V C3022 4822 124 41004 220µF 6.3V C3023 5322 122 32452 47pF 5% 50V C3024 4822 126 12244 10nF 50V C3025 4822 124 80079 10µF 16V C3026 4822 124 23366 4.7µF 25V C3027 5322 122 31946 27pF 5% 50V C3028 5322 122 32661 56pF 5% 50V C3029 4822 124 11298 4.7µF 10% 10V tantal C3030 4822 124 80073 100µF 6.3V C3031 4822 124 40822 100µF 16V C3032 4822 124 80078 33µF 10V C3033 4822 126 10326 180pF 10% 50V C3034 5322 122 34123 1nF 10% 50V C3035 4822 124 80078 33µF 10V C3036 4822 124 22878 470µF 10V C3037 4822 124 80076 47µF 6.3V C3038 4822 124 23593 47µF 16V C3039 4822 124 23593 47µF 16V C3040 4822 124 80076 47µF 6.3V C3041 4822 126 12253 1000nF 16V C3042 4822 126 12282 100nF 25V C3043 4822 126 12244 10nF 50V C3201 4822 124 80079 10µF 16V C3202 4822 126 12244 10nF 50V C3203 4822 126 12244 10nF 50V C3204 4822 126 12244 10nF 50V C3205 4822 126 12244 10nF 50V C3207 4822 126 12244 10nF 50V C3208 5322 122 32658 22pF 5% 50V C3209 5322 122 31946 27pF 5% 50V C3210 5322 122 32965 18pF 5% 50V C3212 4822 124 80085 3.3µF 50V C3213 4822 126 12244 10nF 50V C3214 4822 126 10326 180pF 5% 50V C3215 4822 126 12244 10nF 50V C3216 4822 126 12245 220pF 10% 50V C3502 4822 124 41004 220µF 6.3V C3503 4822 126 10525 8.2nF 10% 50V C3504 4822 126 10525 8.2nF 10% 50V C3505 4822 124 80083 1µF 50V C3506 4822 124 23366 4.7µF 25V C3507 5322 122 34123 1nF 50V C3508 5322 122 33869 15pF 5% 50V C3509 4822 126 12244 10nF 50V C3512 4822 126 12238 100nF 25V C3513 4822 126 12238 100nF 25V C3514 4822 124 23366 4.7µF 25V C3517 5322 122 33869 15pF 5% 50V	C3519 4822 124 23366 4.7µF 25V C3520 4822 126 12238 100nF 25V C3523 4822 126 12244 10nF 50V C3524 4822 124 23366 4.7µF 25V C3525 4822 126 12282 100nF 25V C3527 4822 126 12243 10pF 0.5 50V C3528 4822 126 12282 100nF 25V C3529 4822 126 12244 100nF 25V C3530 5322 122 34123 1nF 50V C4201 4822 126 10936 22µF 16V C4202 4822 124 23815 2.2nF 50V C4203 5322 122 34098 10nF 10% 50V C4205 4822 126 12244 10nF 50V C4206 4822 124 80081 10µF 16V C4207 4822 122 33891 3.3nF 10% 50V C4208 5322 122 34098 10nF 50V C4209 4822 124 80086 1µF 50V C4210 4822 124 80075 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4822 051 20273 27k 0.1W 5% R7510 4822 051 20102 1k 0.1W 5% R7511 4822 051 20102 1k 0.1W 5% R7513 4822 051 20102 1k 0.1W 5% R7514 4822 051 20102 1k 0.1W 5% R7515 4822 051 20102 1k 0.1W 5% R7516 4822 051 20102 1k 0.1W 5% R7517 4822 051 20102 1k 0.1W 5% R7518 4822 051 20102 1k 0.1W 5% R7520 4822 051 20101 100E 0.1W 5% R7521 4822 051 20101 100E 0.1W 5% R7522 4822 051 20101 100E 0.1W 5% R7523 4822 051 20102 1k 0.1W 5% R7524 4822 051 20102 1k 0.1W 5% R7525 4822 051 20102 1k 0.1W 5% R7526 4822 051 20102 1k 0.1W 5% R7531 4822 051 20102 1k 0.1W 5% R7538 4822 051 20473 47k 0.1W 5% R7539 4822 051 20222 2.2k 0.1W 5% R7540 4822 051 20101 100E 0.1W 5% R7541 4822 051 20103 10k 0.1W 5% R7542 4822 051 20103 10k 0.1W 5% R7543 4822 051 20222 2.2k 0.1W 5% R7544 4822 051 20103 10k 0.1W 5% R7545 4822 051 20103 10k 0.1W 5% R7546 4822 051 20123 12k 0.1W 5% R7547 4822 051 20103 10k 0.1W 5% R7548 4822 051 20102 1k 0.1W 5% R7549 4822 051 20223 22k 0.1W 5% R7550 4822 051 20223 22k 0.1W 5%	R7551 4822 116 52233 10k 0.25W 5% R7552 4822 116 52197 56E 0.25W 5% R7553 4822 116 52233 10k 0.25W 5% R7554 4822 116 52197 56E 0.25W 5% R7555 4822 116 52233 10k 0.25W 5% R7556 4822 116 52197 56E 0.25W 5% R7598 4822 051 20222 2.2k 0.1W 5% R7599 4822 051 20102 1k 0.1W 5% RX7501 4822 111 92076 Resistor network TH6001 4822 111 92078 Thermistor 2.2k DL3001 4822 320 50253 Delay line L1001 4822 157 63772 L1003 4822 157 63769 33μH L1004 4822 157 63781 22μH L1005 4822 148 81235 Transformer L1006 4822 157 63782 22μH L1007 4822 148 81236 Transformer L1008 4822 157 63781 22μH L1009 4822 157 63781 22μH L1011 4822 157 63779 22μH L1012 4822 157 63775 L1301 4822 157 63779 22μH L1302 4822 157 63778 22μH L3001 4822 157 53666 10μH L3002 4822 157 10214 22μH L3003 4822 157 52413 330μH L3004 4822 157 10213 18μH L3005 4822 157 62956 1μH L3006 4822 157 52486 33μH L3007 4822 157 52485 100μH L3008 4822 157 62454 47μH L3009 4822 157 52485 100μH L3010 4822 157 52485 100μH L3011 4822 157 63776 100μH L3012 4822 157 52485 100μH L3013 4822 157 10212 15μH L3201 4822 157 52485 100μH L3202 4822 157 63771 Filter L3203 4822 157 53851 39μH L3204 4822 157 53666 10μH L3206 4822 157 52413 330μH L3501 4822 157 52485 100μH L4203 4822 157 63777 15μH L4401 4822 157 63774 L4402 4822 157 63774 L6001 4822 157 63773 4.7μH T1301 4822 148 81234 Transformer 4822 130 61531 2SA1037KR 4822 130 62913 2SB709-QRS 4822 130 61537 2SC2412KR Q1001 4822 130 62971 2SB710A-RS Q1002 4822 130 62968 2SB1073-QR Q1004 4822 130 62967 2SB1050-QR Q1005 4822 130 61068 XN1501 Q1006 4822 130 62967 2SB1050-QR Q1007 4822 130 61595 2SD1330-RST Q1008 4822 130 62976 2SK1190 Q1010 4822 111 90814 UN2212 Q1011 4822 130 62974 2SB953A-PQ Q1012 4822 130 62975 2SD874A-Q Q1013 4822 130 62973 2SB793A-RS Q1014 4822 130 62967 2SB1050-QR Q1015 4822 111 90815 UN2213 Q1016 4822 130 62972 2SB766A-RS Q1017 4822 130 62714 2SC3852 Q1018 4822 111 90811 UN2111 Q1019 4822 111 90815 UN2213 Q1201 4822 130 62969 2SB644-QRS Q1202 4822 130 62967 2SB1050-QR	Q1301 4822 111 90811 UN2111 Q1302 4822 111 90815 UN2213 Q1303 4822 111 90815 UN2213 Q1304 4822 130 62313 2SD1483 Q1305 4822 130 60564 2SB956-RS Q1306 4822 130 61315 2SD1119-QR Q1307 4822 130 42671 2SD601-RS Q1551 4822 130 42248 PN150NV Q1552 4822 130 42248 PN150NV Q3008 4822 130 62975 2SD874-QRS Q3208 4822 130 42468 2SC2404-BCD Q4204 4822 130 60729 DTC124EK Q4206 4822 130 90323 DTC114TK Q4207 4822 130 90326 DTA114TK Q4208 4822 130 90323 DTC114TK Q6002 4822 130 62313 2SD1483 Q6003 4822 130 62981 2SD947 Q6008 4822 130 62981 2SD947 Q6009 4822 130 60811 DTA114EK Q6010 4822 130 62966 2SA1618 Q6011 4822 130 62817 DTC143EK Q6203 4822 130 62965 UN2210 Q7501 4822 130 42571 2SD1458 Q7503 4822 130 61268 DTC114EK Q7504 4822 111 90811 UN2111 Q7505 4822 130 61533 2SB643-QRS Q7551 4822 130 42571 2SD1458 Q7552 4822 130 42289 2SC2021M-RS Q7553 4822 130 42571 2SD1458 Q7554 4822 130 42289 2SC2021M-RS Q7555 4822 130 42571 2SD1458 Q7556 4822 130 42289 2SC2021M-RS 4822 130 31993 LN48YCCP LED 4822 130 80727 MA110 D1001 4822 130 80732 MA728 D1002 4822 130 82937 SFPB-54V D1003 4822 130 82933 MA8051-M 5.1V D1004 4822 130 82941 SFPB-52V D1005 4822 130 82942 SFPB-52VL D1006 4822 130 32709 ERC81-004 D1007 4822 130 82934 MA8220-M 22V D1008 4822 130 43408 MA151WK D1009 4822 130 32709 ERC81-004 D1010 4822 130 82514 MA2220 22V Zener D1011 4822 130 82514 MA2220 22V Zener D1012 4822 130 82932 MA4160-M 16V D1013 4822 130 31157 RD6.2EB 6.2V Zener D1014 4822 130 32635 MA151K D1015 4822 130 82929 MA4068-M 6.8V D1016 4822 130 32635 MA151K D1017 4822 130 82936 RU3YX D1202 5322 130 82301 MA858 D1205 4822 130 82928 MA4036-M 3.6V D1206 4822 130 43408 MA151WK D1301 4822 130 80732 MA728 D1302 4822 130 82938 SFPB-59V D1303 4822 130 82931 MA4150-L 15V Zener D1304 4822 130 82939 SFPB-59VL D1305 4822 130 82939 SFPB-59VL D3002 4822 130 80377 MA3091-M 9.1V D3003 4822 130 81386 MA3100-L 10V D4204 4822 130 32868 MA153 D4206 4822 130 82927 MA3030-L 3V Zener D6003 4822 130 81359 ERA15-01V5 1.5V D6202 4822 130 32635 MA151K D6207 4822 130 32868 MA153	D7502 4822 130 33935 MA4051-M D7503 4822 130 32362 MA165 D7504 4822 130 32362 MA165 D7505 4822 130 32362 MA165 D7701 4822 130 81259 MA4062-M 6.2V D7702 4822 130 81259 MA4062-M 6.2V D7703 4822 130 82935 RD9.1EW 9.1V D7704 4822 130 82935 RD9.1EW 9.1V IC1001 4822 209 30973 UPC1150GS IC1002 4822
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